Shri Rawatpura Sarkar University, Raipur

Examination Scheme & Syllabus

for

BACHELOR OF OPTOMETRY

SEMESTER-II

CBCS PATTERN

(Effective from the session: 2022-23)

PROGRAM OUTCOME

1. Understood the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.
2. Acquired the skills in handling scientific instruments, planning and performing in laboratory experiments. The skills of observations and drawing logical inferences from the scientific experiments.
3. Analyzed the given scientific data critically and systematically and the ability to draw the objective conclusions. Been able to think creatively (divergently and convergent) to propose novel ideas in explaining facts and figures or providing new solution to the problems.
4. Realized how developments in any science subject helps in the development of other science subjects and vice-versa and how interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments.
5. Developed scientific outlook not only with respect to science subjects but also in all aspects related to life. Can have greatly and effectively influence which inspires in evolving new scientific theories and inventions. Imbibed ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.
6. Developed various communication skills such as reading, listening, speaking, etc., which we will help in expressing ideas and views clearly and effectively.
7. Realized that pursuit of knowledge is a lifelong activity and in combination with untiring efforts and positive attitude and other necessary qualities leads towards a successful life

PROGRAM SPECIFIC OBJECTIVE

1. Be able to develop skills to provide comprehensive eye examination
    a. To acquire knowledge on ocular structures, its functions and pathological changes
b. To carryout ophthalmic investigations
    c. To impart knowledge with regard to common eye diseases
    d. To impart knowledge on treatment modalities from the perspective of counselling
    e. To acquire knowledge about the referral guidelines for ocular and systemic conditions
2. Be able to correct refractive error and provide spectacle prescription
3. Be able to fit, evaluate, prescribe and dispense contact lenses for refractive correction and other ocular conditions
4. Be able to assess the low vision and provide comprehensive low vision care
5. Be able to have adequate knowledge to develop skill in manufacturing of spectacle lenses, contact lenses and low vision devices.
6. Be able to do complete binocular vision assessment, manage non-strabismic binocular vision anomalies and refer condition which warrants surgery
7. Be able to assess the visual demands for various occupations and match it to the visual capabilities. Also be able to advice on eye safety wear for various occupations.
8. Have knowledge and skill for early detection of various ocular conditions and pathologies – Refractive error, Strabismus, Cataract, Diabetic retinopathy, Glaucoma etc.
9. Have knowledge regarding organizations of eye banks and preservation of ocular tissues.
10. Have knowledge on sensory substitution and other rehabilitation measures for totally visually challenged.
11. Have knowledge of counselling on visual/ocular hygiene, nutritional and environmental modification.

Faculty of Science
Shri Rawatpura Sarkar University, Raipur
Bachelor of Optometry
Semester-II
Examination Scheme
(Effective from the session: 2022-23)

S. No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs)
			L	**T**	**P**		Continuous Evaluation	Sem End Exam	Total	
1.	SBS07101T	General Anatomy		4		4	30	70	100	3
2.	SBS07102T	General Physiology		4		4	30	70	100	3
3.	SBS07103T	Physical Optics &Geometrical Optics		4		4	30	70	100	3
4.	SBS07181T	English Language		4		2	15	35	100	3
5.	SBS07191P	Lab Course I: Basic Anatomy			4	2	15	35	50	5
6.	SBS07192P	Lab Course II: Physiology			4	2	15	35	50	5
7.	SBS07193P	Lab Course III: Practical Physical & Geometrical Optics			4	2	15	35	50	5
	TOTAL			16	12	22			550	

Course Title	**OCULAR ANATOMY AND PHYSIOLOGY**				
Course Code	**SBS07201T**				
Course Credits	**L**	**T**	**P**	**TC**	
	4			**4**	
Prerequisites	**Basic Knowledge about Human Eye Anatomy and Physiology.**				
Course objectives	To provide the essential background in Eye anatomy and Physiology. The subject will provide the essential background to the anatomy and physiology of the human visual system, including eye and brain with emphasis on Anatomy of first to seventh cranial nerve.				
Course Contents	**UNIT I** To provide the essential background in Eye anatomy. The subject will provide the essential background to the anatomy of the human visual system, including eye and brain with emphasis on Anatomy of first to seventh cranial nerve. **UNIT II** **Eye:** Sclera, Cornea, Choroid, Ciliarybody, Iris &PupiL, Retina**.**Refractory media:Aqueous humor, Anterior chamber, Posterior chamber, Lens, Vitreous body**.**Refractory media:Aqueous humor, Anterior chamber, Posterior chamber, Lens, Vitreous body**.** Eyelids anatomy & functions.Conjunctiva, Development of eye &adnexia, EOM. **UNIT III** **Protective mechanisms of the eye:** Eye lids and lacrimation, description of the globe**,** Extrinsic eye muscles, their actions and control of their movements, Coats of the eyeball, Cornea.Aqueoushumor and vitreous Intraocular tension, Iris and pupil, Crystalline lens and accommodation – presbyopia, Mechanism- Accommodation, Retina- structure & functions. **UNIT IV** **Vision-** general aspects of sensation, Pigments of the eye and photochemistry, The visual stimulus, refractive errors, Visual acuity, vernier acuity and the principals of measurement. **Visual perception-** Binocular vision, stereoscopic vision, optical illusions, Visual pathway, central and cerebral connections, Introduction to Electro Physiology. **UNIT V** Scotopic and Photopic Vision,Retinal sensitivity & Visibility Receptive stimulation & Flicker Scotopic and Photopic Vision, Retinal sensitivity & Visibility Receptive stimulation & Flicker, Ocular movement & saccades, Visual perception and adaptation, Introduction to visual psychology.				

Course outcomes	• To provide the essential background in Eye anatomy • To understand about physiology of the eye • To understand Protective mechanisms of the eye • To understand general aspects of vision/sensation • To know about photoreceptors
Text books	1. Guyton, A.C. & Hall, J.E. (2006). 2. Textbook of Medical Physiology. XI Edition. 3. Hercourt Asia PTE Ltd. /W.B. Saunders Company.
Reference books	1. Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XIEdition John Wiley & sons 2. Victor P. Eroschenko. (2008). diFiore's Atlas of Histology with Functionalcorrelations. XII Edition. Lippincott W. & Wilkins.

Course Title	**OCULAR BIOCHEMISTRY & BASIC PHARMACOLOGY**				
Course Code	**SBS07202T**				
Course Credits	**L**	**T**	**P**	**TC**	
	4			**4**	
Prerequisites	**Basic Knowledge about Chemistry and Biology.**				
Course objectives	The subject will extend the range of clinical and academic material by providing the basic and pharmacology and pharmaceutics for the application of diagnostic and over-the-counter ophthalmic drugs in general clinical optometric practice.				
Course Contents	**UNIT –I** Hormones basic concepts in metabolic regulation with examples say insulin, Metabolism: General wholebody metabolism.(Carbohydrates, proteins, lipids.), Ocular Biochemistry Various aspects of the eye, viz., cornea, lens aqueous, vitreous, retina and pigment rhodopsin. (The important chemicals in each and their roles.) Immunology of anterior segment. **UNIT -II** Colloidal state, sol. Gel. Emulsion, dialysis, electrophoresis. pH buffers mode of action, molar and percentage solutions, photometer, colorimeter and spectrometry, Radio isotopes: application in medicine and basic research,				

	Clinical Biochemistry Blood sugar, urea, creatinine and bilirubin. **UNIT -III** **GENERAL PHARMACOLOGY:** .Mechanisms of drug action**,** Dose – responserelationship**,** Tachyphylaxis& idiosyncrasy, Pharmacokineti drug absorption, distribution, Biotransformation, excretion and toxicity, Factors influencing drug metabolism of drug action. **UNIT- IV** **ACTION OF SPECIFIC AGENTS:**Depressants, Anti- coagulants, C.N.S. Stimulants and antidepressants 8.4Diuretics and hypertensive agents , Cardiovascular drugs, Histamines, Serotonin, Protaglandins. **UNIT- V** **PRINCIPLES OF OCULAR PHARMACOLOGY:** Current optometric drugs in use, Preparation and packaging of ophthalmic drugs.General principals of ocular pharmacology: Drug actions and effectiveness. Drug safety. Factors influencing the objectively demonstrated response, Ocular penetration and Routes of ocular penetration, Optometric Diagnostic Drug: Optometric use in pharmaceuticals, Disinfection & Sterilization–Clinical instruments in particular.
Course outcomes	• To understand Ocular Biochemistry Various aspects of the eye • To understood Clinical Biochemistry • To understand general physiology • To know actions of specific agents • To understand principles of ocular pharmacology
Text and References	1. Biochemistry Simplified New Fifth Edition 2019 Textbook of Biochemistry for Medical Students Paperback – 1 January 2019by Prasad R Manjeshwar (Author) 2. Biochemistry Paperback – 1 June 2017 by U Satyanarayana M.Sc. Ph.D. F.I.C. F.A.C.B. (Author)
Reference books	1. Self Assessment and Review of Biochemistry Paperback – 1 March 2019 by Rebecca James Perumcheril (Author) 2. Biochemistry Simplified New Fifth Edition 2019 Reference book of Biochemistry for Medical Students Paperback – 1 January 2019by Prasad R Manjeshwar (Author)

Bachelor of Optometry
Semester -II
2022-22

Course Title	**MICROBIOLOGY AND PATHOLOGY**				
Course Code	**SBS07203T**				
Course Credits	**L**	**T**	**P**	**TC**	
	4			**4**	
Prerequisites	**Basic Knowledge about Microbiology.**				
Course Objective	The subject will extend the range of clinical and academic material by providing the basic microbiology and pathology for the application of diagnostic and over-the-counter ophthalmic drugs in general clinical optometric practice.				
Course Contents	**UNIT-I** Specific infections: Tuberculosis, Leprosy, Syphilis, Fungal infection Viral chlamydial infection, Infection in general. **UNIT-II** Inflammation and repair, Neoplasia **UNIT-III** Circulatory disturbances, Thrombosis, Infarction, Embolism Immune system. **UNIT-IV** Clinical pathology: Interpretation of urinereport, Interpretation of bloodsmears, Shock, Anaphylaxis, Allergy. **UNIT-V** Haematology: Anemia, Leukemia, Bleedingdisorders, Anemia : Introduction, Classification and Lab diagnosis of : Iron Deficiency Aneamia Hemolytic Aneamia ,Megaloblastic Anemia,Sickle cell Anemia.				
Course Outcomes	• To understand about Specific infections • To know about Inflammation and repair • To understand about Immune system • To know about Clinical pathology • To understand about Haematology				
Text books	1. Microbiology with Diseases by Body System Paperback – 30 June 2017 by Bauman Robert W. (Author) 2. Microbiology with Diseases by Taxonomy Paperback – 30 June 2017by Bauman Robert W. (Author)				
Reference	1. Essentials of Medical Microbiology Paperback – 1 January				

books	2018by Apurba S. Sastry (Author), Sandhya Bhat (Author) 2. Microbiology with Diseases by Body System Paperback – 30 June 2017 by Bauman Robert W. (Author) 3. Basic Pathology: Robbins, Kumar and Cotran, Elsevier Publications, latest editions

Course Title	**ENVIRONMENTAL STUDIES**				
Course Code	**SBS07204T**				
Course Credits	**L**	**T**	**P**	**TC**	
	2			**2**	
Prerequisites	**Basics knowledge of Environmental Science.**				
Course objectives	Upon completion of the course the student shall be able to Create the awareness about environmental problems among learners Impart basic knowledge about the environment and its allied problems. Develop an attitude of concern for the environment. Motivate learner to participate in environment protection and environment improvement. Acquire skills to help the concerned individuals in identifying and solving environmental problems. Strive to attain harmony with nature.				
Course Contents	**UNIT I** The multidisciplinary nature of environmental studies Definition, scope and importance. Need for public awareness. **UNIT II** Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. (c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. (d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.				

	(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies. (f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. · Role of an individual in conservation of natural resources. · Equitable use of resources for sustainable lifestyles. **UNIT III** Ecosystems · Concept of an ecosystem · Structure and function of an ecosystem · Producers, consumers and decomposers · Energy flow in the ecosystem · Ecological succession · Food chains, food webs and ecological pyramids · Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries). **UNIT IV** Biodiversity and its conservation · Introduction – Definition: genetic, species and ecosystem diversity · Bio-geographical classification of India · Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values · Biodiversity at global, national and local levels · India as a mega-diversity nation · Hot-spots of biodiversity · Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts · Endangered and endemic species of India · Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. **UNIT V** Environmental Pollution Definition · Causes, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear pollution · Solid waste management: Causes, effects and control measures of urban and industrial wastes. · Role of an individual in prevention of pollution · Pollution case studies · Disaster management: floods, earthquake, cyclone and landslides.
Course Outcomes	• The multidisciplinary nature of environmental studies • To understood about Natural Resources: Renewable and non-renewable resources • To understood about Ecosystems • Biodiversity and its conservation • To understand Environmental Pollution
Text Books	

	• Environment and Ecology by Piyush Kant Pandey and Dipti Gupta (Sum India Publication) • A Textbook of Environmental Chemistry and Pollution Control by S.S. Dara (S. Chand and Company) • Environmental Chemistry by B.K. Sharma (Krishna Prakashan).
Reference Books	• Masters, G.M. Introduction to Environment Engineering and Science (Prentice Hall of India). • Environmental Chemistry by A.K. Dey (Eastern Ltd.). • Nebel B.J. Environmental Science (Prentice Hall of India-1987). • Environmental Biotechnology by S.N. Jogdand (Himalaya Publishing House). • Introduction to Environmental Biotechnology by A.K. Chatterji (Prentice Hall of India).

Course Title	**PRACTICAL OCULAR ANATOMY AND PHYSIOLOGY**				
Course Code	**SBS07291P**				
Course Credits	**L**	**T**	**P**	**TC**	
			2	**2**	
Prerequisites	**Basic Knowledge about Human Eye Anatomy and Physiology.**				
Course objectives	To provide the essential background in Eye anatomy and Physiology. The subject will provide the essential background to the anatomy and physiology of the human visual system, including eye and brain with emphasis on Anatomy of first to seventh cranial nerve.				
Course Contents	• **Cornea** • **Uveal tissue** • **Lens** • **Aqueous humour** • **Vitreous humour** • **Retina** • **Optics nerve**				
Course	• To provide the essential background in Eye anatomy				

outcomes	• To understand about physiology of the eye • To understand Protective mechanisms of the eye • To understand general aspects of vision/sensation • To know about photoreceptors
Text and References	1. Guyton, A.C. & Hall, J.E. (2006). 2. Textbook of Medical Physiology. XI Edition. 3. Hercourt Asia PTE Ltd. /W.B. Saunders Company.
Reference books	1. Tortora, G.J. & Grabowski, S. (2006). Principles of Anatomy & Physiology. XIEdition John Wiley & sons 2. Victor P. Eroschenko. (2008). diFiore's Atlas of Histology with Functionalcorrelations. XII Edition. Lippincott W. & Wilkins.

Course Title	**PRACTICAL BASIC BIOCHEMISTRY & PHARMACOLOGY**				
Course Code	**SBS07292P**				
Course Credits	**L**	**T**	**P**	**TC**	
			2	**2**	
Prerequisites	**Practical knowledge about chemistry and biology.**				
Course objectives	The subject will extend the range of clinical and academic material by providing the basic and pharmacology and pharmaceutics for the application of diagnostic and over-the-counter ophthalmic drugs in general clinical optometric practice.				
Course Contents	• **Basic Lab requirements:** - Volumetric flask, falcons, mortar and pestle, watch glass, wash bottle, beaker, measuring cylinder. - Dropper, burette, spatula, reagent bottle, test tube stand, pipette stand, tripod stand, Bunsen burner, wire gauze, crucible, funnel, centrifuge tubes • **Instruments:** - Separatory funnel, centrifuge, pH meter, Electric balance, hot plate - Determination of pH of various solutions using a pH meter – NaOH, sulphuric acid, distilled water Preparation of Normal solution- NaOH - Preparation of percentage/ vov-vol solutions- Sulphuric acid				

	- Paper Chromatography- Isolation of the pigments from leaves of Raddish
Course outcomes	• To understand Ocular Biochemistry Various aspects of the eye • To understood Clinical Biochemistry • To understand general physiology • To know actions of specific agents • To understand principles of ocular pharmacology
Text and References	1. Biochemistry Simplified New Fifth Edition 2019 Textbook of Biochemistry for Medical Students Paperback – 1 January 2019by Prasad R Manjeshwar (Author) 2. Biochemistry Paperback – 1 June 2017by U Satyanarayana M.Sc. Ph.D. F.I.C. F.A.C.B. (Author)
Reference books	1. Self Assessment and Review of Biochemistry Paperback – 1 March 2019 by Rebecca James Perumcheril (Author) 2. Biochemistry Simplified New Fifth Edition 2019 Reference book of Biochemistry for Medical Students Paperback – 1 January 2019by Prasad R Manjeshwar (Author)

Course Title	**PRACTICAL MICROBIOLOGY AND PATHOLOGY**				
Course Code	**SBS07293P**				
Course Credits	**L**	**T**	**P**	**TC**	
			2	**2**	
Prerequisites	**Practical Knowledge about Microbiology.**				
Course Objective	The subject will extend the range of clinical and academic material by providing the basic microbiology and pathology for the application of diagnostic and over-the-counter ophthalmic drugs in general clinical optometric practice.				
Course Contents	• **Basic Lab Glassware:** - Test tubes, screw capped tubes, pipette, Pasteur pipettes				

	- Erlenmeyer flask, Eppendorf tubes, pipette tips, cover slip and slides. • **Basic Lab Instrumentation:** - Autoclave, incubator, Hot air oven, pH meter, Centrifuge, - Laminar air flow, Separatory funnel, centrifuge, pH meter, Electric balance, hot plate. - Serial dilution with methyl orange indicator. - Principles & Working of the pH meter. - Determination of pH of water samples from different sources. - Determination of pH of various solutions using a pH meter – NaOH, sulphuric acid, distilled water.
Text books	1. Microbiology with Diseases by Body System Paperback – 30 June 2017 by Bauman Robert W. (Author) 2. Microbiology with Diseases by Taxonomy Paperback – 30 June 2017 by Bauman Robert W. (Author)
Reference books	1. Essentials of Medical Microbiology Paperback – 1 January 2018 by Apurba S. Sastry (Author), Sandhya Bhat (Author) 2. Microbiology with Diseases by Body System Paperback – 30 June 2017 by Bauman Robert W. (Author) 3. Basic Pathology: Robbins, Kumar and Cotran, Elsevier Publications, latest editions