

Shri Rawatpura Sarkar University, Raipur



Examination Scheme & Syllabus

for

BACHELOR OF OPTOMETRY

SEMESTER-I

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 modifications



Faculty of Science
Shri Rawatpura Sarkar University, Raipur
Bachelor of Optometry
Semester-I
Examination Scheme
(Effective from the session: 2022-20)

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



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Course Title	GENERAL ANATOMY				
Course Code	SBS07101T				
Course Credits	L	T	P	TC	
	4			4	
Prerequisites	Basic Knowledge about Human Anatomy.				
Course objectives	This subject gives an insight of the parts of the human body their structure and function in detail. Organs of the body will be studied to understand their structure, location in the body, their function and how they interact with other parts of the body.				
Course Contents	<p>UNIT I</p> <p>Introduction: Human body as a whole</p> <p>Definition of anatomy and its divisions, Terms of location, positions and planes, Cell and its organelles, Epithelium-definition, classification, describe with examples, function, Glands-classification, describe serous & mucous glands with examples, Basic tissues – classification with examples.</p> <p>UNIT II</p> <p>Locomotion and Support</p> <p>Cartilage – types with example & histology, Bone – Classification, names of bone cells, parts of long bone, microscopy of compact bone, names of bones, Muscular system- Classification of muscular tissue & histology, Names of muscles of the body. Sensory Organs: Skin: Skin-histology, Appendages of skin, Eye: Parts of eye & lacrimal apparatus, Extra-ocular muscles & nerve supply, Ear: parts of ear- external, middle and inner ear and contents.</p> <p>UNIT III</p> <p>Cardiovascular System</p> <p>Heart-size, location, chambers, exterior & interior, Blood supply of heart, Systemic & pulmonary circulation, Lymphatic system- cisterna chyli& thoracic duct, Histology of lymphatic tissues, Names of regional lymphatics, axillary and inguinal lymph nodes in brief.</p> <p>Respiratory System</p> <p>Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments, Histology of trachea, lung and pleura, Names of paranasal air sinuses.</p>				



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	<p>Peritoneum: Description in brief. Urinary System: Kidney, ureter, urinary bladder, male and female urethra, Histology of kidney, ureter and urinary bladder. Embryology: Spermatogenesis & oogenesis, Ovulation, Fertilization, Fetal circulation, Placenta.</p> <p>UNIT IV</p> <p>Gastro-intestinal System: Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring), Oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas, Radiographs of abdomen. Reproductive System: Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology), Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology), Mammary gland-gross.</p> <p>UNIT V</p> <p>Endocrine Glands: Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland, suprarenal gland (gross & histology).</p> <p>Nervous System: Neuron, Classification of NS, Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology), Meninges, Ventricles & cerebrospinal fluid, Names of basal nuclei, Blood supply of brain, Cranial nerves, Sympathetic trunk & names of parasympathetic ganglia.</p>
<p>Course Outcomes</p>	<ul style="list-style-type: none"> • To understand Introduction: Human body as a whole • To understand Cardiovascular System • To understand Respiratory System • To understand Gastro-intestinal System • To understand Nervous System
<p>Text Books</p>	<ol style="list-style-type: none"> 1. Human Anatomy Regional And Applied Vol-2 Paperback – 1 January 1996 by B.D. Chaurasia (Author) 2. Guyton, Arthur, Text Book of Physiology, Prism Publishers.
<p>Reference Books</p>	<ol style="list-style-type: none"> 1. Chaurasia's Handbook of General Anatomy Paperback – 1 December 2006 by B. D. Chaurasia (Author) 2. Chatterjee, C C, Human Physiology, Medical Allied Agency.



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Course Title	GENERAL PHYSIOLOGY			
Course Code	SBS07102T			
Course Credits	L	T	P	TC
	4			4
Prerequisites	Basic Knowledge of Human Physiology.			
Course objectives	Students will acquire the knowledge necessary to understand what the body is doing and how they can help the body cope with many different situations. A total of 66 hours is dedicated to this subject where teaching methods will include Lectures, demonstration & Practicals and the mode of assessment shall be in the form of Written Paper.			
Course Contents	<p>UNIT-I</p> <p>Cell: Definition, Structure and function of Cytoplasmic Organelles, Reproduction-Meiosis, Mitosis. The important physico-chemical laws applied to physiology: Diffusion, Osmosis, Bonding, Filtration, Dialysis, Surface Tension, Adsorption, Colloid.</p> <p>UNIT-II</p> <p>Introduction- composition and function of blood: Red blood cells- Erythropoiesis, stages of differentiation function, counts physiological Variation. Haemoglobin -Structure, function, concentration physiological variation. Methods of Estimation of Hb, White blood cell- Production, function, life span, count, differential count.</p> <p>UNIT-III</p> <p>Platelets- Origin, normal count, morphology functions. Plasma Proteins- Production, concentration, types, albumin, globulin, fibrinogen, Prothrombin functions. Haemostasis& Blood coagulation. Haemostasis – Definition, normal haemostasis, clotting factors, mechanism of clotting disorders of clotting factors.</p> <p>UNIT- IV</p> <p>Blood Bank, Blood groups - A, B, O system, Rh system, Blood grouping & typing, Cross-matching, Rh system-Rh factor, Rh in Cross-matching, Blood transfusion – Indication, universal donor and recipient concept. Selection criteria of a blood donor. Transfusion Anticoagulant – Classification, Examples and uses. Anaemia’s: Classification: morphological and etiological. Effects of anaemia on body.</p>			



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	<p>UNIT -V</p> <p>Blood indices – Colour index, MCH, MCV, MCHC, Erythrocyte Sedimentation Rate (ESR) and Packed cell volume, Normal Values, Definition, determination. Blood Volume – Normal value, determination of blood volume and regulation of blood volume body fluid- pH, normal value, regulation and variation.</p>
Course Outcomes	<ul style="list-style-type: none"> • To know about Cell • To know about Introduction- composition and function of blood • To know about Platelets • To understand Blood grouping & typing • To understand Blood indices
Text Books	<ol style="list-style-type: none"> 1. Human Anatomy Regional And Applied Vol-2 Paperback – 1 January 1996 by B.D. Chaurasia (Author) 2. Guyton, Arthur, Text Book of Physiology, Prism Publishers.
Reference Books	<ol style="list-style-type: none"> 1. Chaurasia's Handbook of General Anatomy Paperback – 1 December 2006 by B. D. Chaurasia (Author) 2. Chatterjee, C C, Human Physiology, Medical Allied Agency.

Course Title	PHYSICAL OPTICS & GEOMETRICAL OPTICS				
Course Code	SBS07103T				
Course Credits	L	T	P	TC	
	4			4	
Prerequisites	Basic Knowledge of Optics.				
Course objectives	Students will acquire the knowledge necessary to understand importance of lightning and how they can help the body cope with many different situations demonstrations & Practicals and the mode of assessment shall be in the form of Written Paper.				
Course Contents	<p>UNIT-I</p> <p>Interference: Description of phenomena- Young's experiment, coherent sources, phase and path, difference, intensity. Theory of interference fringes Interference in thin films- interference due to reflected and transmitted light- Lloyd's single mirror, Colors of thin films-wedge shaped thin films testing of</p>				



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	<p>planeness of surface Newton's rings experiment- refractive index of liquid Non-reflecting films Visibility of fringes.</p> <p>UNIT-II</p> <p>Polarization: Polarization, Polarization of transverse waves-light as transverse waves, Double refraction, principal plane, nicol prism-plane polarization, Circular, elliptical polarization production, detection and behavior, Polarization by selective absorption-dichorism, Optical activity-Fresnel's half shade , polarimeter, Basic principles of holography Brewste's Law. LASERS: Basics of Lasers.</p> <p>UNIT-III</p> <p>Spectrum: Sources of spectrum, Bunsen- carbon, mercury, sodium, Emission and absorption spectra- classification – visible- ultraviolet and infra red spectra- electromagnetic spectrum, Radiometry and spectroscopic. Diffraction: Single slit, qualitative and quantitative, Circular aperture Double slit pattern and Kirchoff's integral Multiple slits grating, Reflection grating and the zone plate.</p> <p>UNIT-IV</p> <p>Illumination: Luminous flux, candela, solid angle, illumination, utilization factor, depreciation factor, and illumination law. Light sources: Modern sources of light, spectral energy distribution- luminous efficiency- color temperature-color rendering.</p> <p>UNIT-V</p> <p>Visual tasks. Factors affecting visual tasks, Modern theory on light and color: synthesis of light.Additive and subtractive synthesis of colors, Light sources: Modern sources of light, spectral energy distribution- luminous efficiency- color temperature-color rendering.Eye care and lighting –special care with VDU, Photometry: measurement of illumination, photometers and filters.</p>
Course outcomes	<ul style="list-style-type: none">• To understand about Interference• To understand about Polarization• To understand about Spectrum



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	<ul style="list-style-type: none"> • To understand about Illumination • To understand about Visual tasks
Text Books	<ol style="list-style-type: none"> 1. Introduction to Optics, 3e Paperback – 1 January 2014 by Pedrotti (Author) 2. A Text Book of Optics Paperback – 1 December 2006 by Subrahmaniyam N. & et Al. (Author)
Reference Books	<ol style="list-style-type: none"> 1. Concise Optics: Concepts, Examples, and Problems (Textbook Series in Physical Sciences) Paperback – 9 March 2018 2. Optical Physics for Babies (Baby University) Board book – 1 July 2017 by Chris Ferrie (Author)

Course Title	ENGLISH LANGUAGE			
Course Code	SBS07104T			
Course Credits	L	T	P	TC
	4			4
Prerequisites	Basic Knowledge about English Languages			
Course objectives	<p>Upon completion of the course the student shall be able to</p> <ol style="list-style-type: none"> 1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation 2. Communicate effectively (Verbal and Non Verbal) 3. Effectively manage the team as a team player 4. Develop interview skills, 			
Course Contents	<p>UNIT – I</p> <p>Key Concepts</p> <p>Process and Elements of Communication: context of communication; the speaker/writer and the listener/reader; Medium of communication; Principles of communication (7 C's of communication); Barriers in communication, effective communication; Communication in organization.</p> <p>UNIT – II</p> <p>Writing</p> <p>Selecting material for expository, descriptive, and argumentative pieces; Resume;</p>			



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	<p>covering letter, Elements of letter writing and style of writing, business letters: Quotation and Tenders; Basics of Informal and Formal Reports-technical report writing, lab report; Précis writing.</p> <p>UNIT – III</p> <p>Reading</p> <p>Effective Reading; reading different kinds of texts for different purposes; reading between the lines. Comprehension of Unseen Passages.</p> <p>Grammar in use: Errors of Accidence and syntax with reference to Parts of Speech; Agreement of Subject and Verb; Tense and Concord; Use of connectives, Question tags. Voice and Narration. Indianism in English: Punctuation and Vocabulary, Building (Antonym, Synonym, Verbal Analogy and One Word Substitution).</p> <p>UNIT – IV</p> <p>Speaking</p> <p>Achieving desired clarity and fluency; effective speaking; task-oriented, inter-personal, informal and semi-formal speaking. Meetings, Seminar, Conferences, Interviews, Presentation, Audio-visual communication.</p> <p>UNIT – V</p> <p>Listening</p> <p>Achieving ability to comprehend material delivered at relatively fast speed; comprehending spoken material in Standard Indian English, British English and American English; Intelligent listening in situations. Advantages of listening. Hearing and Listening; Essentials of Good Listening. Use of Modern Communication Devices; Telephonic Conversation.</p>
<p>Course outcomes</p>	<ul style="list-style-type: none"> • To understand about Key Concepts • To understand about Writing • To understand about Reading • To understand about Speaking • To understand about Listening
<p>Text books</p>	<ul style="list-style-type: none"> • Sharma RC & Mohan K – "Business Corresponding and Report Writing", Tata McGraw Hill, New Delhi, 1994. • Alok Jain, P S Bhatia & A M Shiekh – "Professional Communication Skills; S. Chand & Company Ltd. 2005. • Rajendra Pal and JS Korlahalli – "Essentials of Business



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	<p>Communication", Sultan Chand & Sons, 1997.</p> <ul style="list-style-type: none"> • A guide to Correct English – Oxford University Press, Ely House, London W.I., Latest Edition. (For Unit III)
Reference books	<ul style="list-style-type: none"> • Fiske, john – "Introduction to Communication Studies", Rotledge London,1990. • Geoffrey Leech & Jan Svartvik – "A Communicative Grammar of English", ELBS Longman, England. • Bill Scott – "The Skills of Communicating", Jaico Publishing House, Mumbai, 2004. • Gartside L- "Model Business Letters", Pitman, London,1992. • Krishna Mohan & N. P. Singh – "Speaking English Effectively"; MacMillan India, New Delhi; 2001. • 100 Tests in VOCABULARY; Indian Institute of Publishing,Chennai.

Course Title	PRACTICAL BASIC ANATOMY				
Course Code	SBS07191P				
Course Credits	L	T	P	TC	
			2	2	
Prerequisites	Practical understanding of the structure of human body in detail.				
Course objectives	This subject gives an insight of the parts of the human body their structure and function in detail. Organs of the body will be studied to understand their structure, location in the body, their function and how they interact with other parts of the body.				
Course Contents	<ol style="list-style-type: none"> 1. Histology of types of epithelium, Histology of serous, mucous & mixed salivary gland. 2. Histology of the 3 types of cartilage, Demo of all bones showing parts, radiographs of normal bones & joints, Histology of compact bone (TS & LS), Demonstration of all muscles of the body, Histology of skeletal (TS & LS), smooth & cardiac muscle. 3. Demonstration of heart and vessels in the body, Histology of large artery, medium sized artery, vein, large vein, Microscopic appearance of large artery, medium sized artery & vein, large vein, pericardium, Histology of lymph node, spleen, tonsil & thymus, Normal chest radiograph showing heart shadows, 				



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	<p>Normal angiograms.</p> <ol style="list-style-type: none"> 4. Demonstration of parts of respiratory system, Normal radiographs of chest, Histology of lung and trachea. 5. Demonstration of reflections. 6. Demonstration of parts of urinary system, Histology of kidney, ureter, urinary bladder, Radiographs of abdomen-IVP, retrograde cystogram. 7. Demonstration of section of male and female pelvis with organs in situ, Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary, Radiographs of pelvis – hysterosalpingogram. 8. Demonstration of the glands, Histology of pituitary, thyroid, parathyroid, suprarenal glands. 9. Histology of peripheral nerve & optic nerve, Demonstration of all plexuses and nerves in the body, Demonstration of all part of brain, Histology of cerebrum, cerebellum and spinal cord. 10. Histology of thin and thick skin, Demonstration and histology of eyeball, Histology of cornea & retina.
Course Outcomes	<ul style="list-style-type: none"> • To understand Introduction: Human body as a whole • To understand Cardiovascular System • To understand Respiratory System • To understand Gastro-intestinal System • To understand Nervous System
Text Books	<ol style="list-style-type: none"> 1. Human Anatomy Regional And Applied Vol-2 Paperback – 1 January 1996 by B.D. Chaurasia (Author) 2. Guyton, Arthur, Text Book of Physiology, Prism Publishers.
Reference Books	<ol style="list-style-type: none"> 1. Chaurasia's Handbook of General Anatomy Paperback – 1 December 2006 by B. D. Chaurasia (Author) 2. Chatterjee, C C, Human Physiology, Medical Allied Agency.

Course Title	PRACTICAL BASIC PHYSIOLOGY			
Course Code	SBS07192P			
Course	L	T	P	TC



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Credits	2	2	
Prerequisites	Practical understanding of the structure of human body in detail.		
Course objectives	This subject gives an insight of the parts of the human body their structure and function in detail. Organs of the body will be studied to understand their structure, location in the body, their function and how they interact with other parts of the body.		
Course Contents	<ol style="list-style-type: none"> 1. Haemoglobinometry. 2. White Blood Cell Count. 3. Red Blood Count. 4. Determination of Blood Groups. 5. Leishman’s staining and Differential WBC count. 6. Determination of packed cell Volume. 7. Erythrocyte sedimentation rate [ESR]. 8. Calculation of blood indices. 9. Determination of Clotting Time, Bleeding Time. 10. Blood pressure Recording. 11. Auscultation for Heart Sounds. 12. Artificial Respiration. 		
Course Outcomes	<ul style="list-style-type: none"> • To know about Cell • To know about Introduction- composition and function of blood • To know about Platelets • To understand Blood grouping & typing • To understand Blood indices 		
Text Books	<ol style="list-style-type: none"> 3. Human Anatomy Regional And Applied Vol-2 Paperback – 1 January 1996 by B.D. Chaurasia (Author) 4. Guyton, Arthur, Text Book of Physiology, Prism Publishers. 		
Reference Books	<ol style="list-style-type: none"> 3. Chaurasia's Handbook of General Anatomy Paperback – 1 December 2006 by B. D. Chaurasia (Author) 		



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	4. Chatterjee, C C, Human Physiology, Medical Allied Agency.
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Course Title	PRACTICAL PHYSICAL & GEOMETRICAL OPTICS			
Course Code	SBS07193P			
Course Credits	L	T	P	TC
			2	2
Course objectives	Practical knowledge about Physics and Optics.			
Course objectives	Students will acquire the knowledge necessary to understand importance of lightning and how they can help the body cope with many differentsituations demonstrations.			
Course Contents	<ul style="list-style-type: none"> • INTERFERENCE <ul style="list-style-type: none"> ○ Description of phenomena- Young’s experiment, coherent sources, phase and path. ○ Newto’s rings experiment- refractive index of liquid Non-reflecting films Visibility of fringes. • DIFFRACTION <ul style="list-style-type: none"> ○ Single slit, qualitative and quantitative ○ Circular aperture Double slit pattern • POLARISATION <ul style="list-style-type: none"> ○ Polarization of transverse waves-light as transverse waves • SPECTRUM <ul style="list-style-type: none"> ○ Sources of spectrum, Bunsen- carbon, mercury, sodium ○ Emission and absorption spectra- classification – visible- ultraviolet and infra red spectra- 			



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	<p style="text-align: center;">electromagnetic spectrum</p> <ul style="list-style-type: none">• BASICS OF LASERS<ul style="list-style-type: none">○ Light sources: Modern sources of light, spectral energydistribution- luminous○ Efficiency- color temperature-color rendering,○ Illumination: Luminous flux, candela, solid angle, illumination, utilization factor, depreciation factor, and illumination.
Course Outcomes	<ul style="list-style-type: none">• To understand about Interference• To understand about Polarization• To understand about Spectrum• To understand about Illumination• To understand about Visual tasks
Text Books	<ol style="list-style-type: none">1. Introduction to Optics, 3e Paperback – 1 January 2014 by Pedrotti (Author)2. A Text Book of Optics Paperback – 1 December 2006 by Subrahmaniyam N. & et Al. (Author)
Reference Books	<ol style="list-style-type: none">1. Concise Optics: Concepts, Examples, and Problems (Textbook Series in Physical Sciences) Paperback – 9 March 20182. Optical Physics for Babies (Baby University) Board book – 1 July 2017 by Chris Ferrie (Author)



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