DPU

Dr. D. Y. PATIL VIDYAPEETH, PUNE

(Deemed to be University)

Revised Syllabus of First Year of

Bachelor of Clinical Optometry (B. Optom.)

Programme (August, 2022)

Academic Year 2022-23 & onwards

Revised as per Ministry of Health and Family Welfare
Model Curriculum Handbook-Optometry

DPU

Dr. D. Y. PATIL VIDYAPEETH, PUNE
(Deemed to be University)
(Accredited (3rd Cycle) by NAAC with a CGPA of 3.64 on four point scale at 'A++' Grade)
(Declared as Category - I University by UGC Under Graded Autonomy Regulations, 2018)
(An ISO 9001:2015 and 14001:2015 Certified University and Green Education Campus)

Dr. A. N. Suryakar
Registrar

Ref. No. : DPU/ 960-D(i)/22
Date : 20.08.2022

NOTIFICATION

Whereas in pursuance of the various decisions taken by the Board of Management regarding **"Syllabus for Bachelor of Clinical Optometry (B. Optom.) – 2014-15" which was revised upto April 2019.** This syllabus is hereby repealed for the students admitted to the **First Year of Bachelor of Clinical Optometry (B. Optom.) Programme** from **Academic Year 2022-2023 and onwards**, however, the same will be **continued for the repeater students**, till the last student clears his/her First Year of the Programme.

Further, for the **students in the Second and subsequent Years**, the earlier syllabus **"Syllabus for Bachelor of Clinical Optometry (B. Optom.) 2014-15" (revised upto April, 2019)** will be **continued,** till the last student clears his/her Second and subsequent Years of the Programme.

And whereas in pursuance of the resolution passed by the **Academic Council** at its meeting held on **29th July, 2022** vide **Resolution No. AC-22(i)-22** regarding the **revision in the syllabus of First Year of Bachelor of Clinical Optometry (B. Optom.) Programme** as per Ministry of Health and Family Welfare Model Curriculum Handbook-Optometry for implementation.

And whereas in pursuance of the resolution passed by the **Board of Management** at its meeting held on **10th August, 2022 vide Resolution No. BM-33(i)-22** regarding the **revision in the syllabus of First Year of Bachelor of Clinical Optometry (B. Optom.) Programme as per Ministry of Health and Family Welfare Model Curriculum Handbook-Optometry** for implementation.

Dr.D.Y.PATIL VIDYAPEETH PIMPRI, PUNE-18. Deemed to be University

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The **Revised Syllabus of First Year (Semester – I & Semester – II) of Bachelor of Clinical Optometry (B. Optom.) Programme (August, 2022)** as per Ministry of Health and Family Welfare Model Curriculum Handbook-Optometry consist for following courses:

Semester - I		Semester – II	
BOPT 101	General Anatomy	BOPT 201	Ocular Anatomy & Ocular Physiology
BOPT 102	General Physiology	BOPT 202	Basic Biochemistry & Basic Pharmacology
BOPT 103	Basic Optics (Physical & Geometrical Optics)	BOPT 203	Basic Pathology & Basic Microbiology
BOPT 104	Dispensing Optics-I	BOPT 204	Ophthalmic Optics
BOPT 105	English & Communication Skills	BOPT 205	Computer for Optometry
BOPT 106	Gender Sensitization		

The Syllabus will be useful to all the concerned. This will come into force with immediate effect.

Dr. D. Y. PATIL VIDYAPEETH PIMPRI, PUNE-18. Deemed to be University

(Dr. A. N. Suryakar)
Registrar
REGISTRAR
DR. D. Y. PATIL VIDYAPEETH, PUNE.

Copy to:

1. PS to Chancellor for kind information of Hon'ble Chancellor, Dr. D. Y. Patil Vidyapeeth, Pune.
2. PS to Vice Chancellor for kind information of Hon'ble Vice Chancellor, Dr. D. Y. Patil Vidyapeeth, Pune.
3. The Dean, Faculty of Allied Medical Sciences, Dr. D. Y. Patil Vidyapeeth, Pune
4. The Director, Dr. D. Y. Patil Institute of Optometry & Visual Sciences, Pimpri, Pune
5. The Controller of Examinations, Dr. D. Y. Patil Vidyapeeth, Pune.
6. Director (IQAC), Dr. D. Y. Patil Vidyapeeth, Pune.
7. Web Master for uploading on Website.

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REGULATION FOR THE UNDER GRADUATE DEGREE PROGRAMME IN OPTOMETRY: BACHELOR OF CLINICAL OPTOMETRY (B. OPTOM.)

1. Eligibility for admission:

Selection procedure:

1. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50%) in Physics, Chemistry, Biology/ Mathematics.

   OR

   Diploma in Optometry after completing 12th class/ 10+2 of CBSE or equivalent with minimum aggregate of 50% marks in Physics, Chemistry And Biology/Mathematics provided the candidate must have passed in each subject separately.

2. Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the eligibility and must have passed in the subjects: Physics, Chemistry, Biology/ Mathematics and English up to 12th Standard level.

   OR

   A candidate must have passed Std. XII or equivalent examination with 50% marks for General Category (45% marks for reserve category) in Physics, Chemistry, Biology / Mathematics and English subjects or a candidate who have passed Minimum Competency Vocational Course (MCVC) from recognized Board with overall 50% marks.

3. He/she has attained the age of 17 years as on 31st December of the year of admission**.**

4. He/she has to furnish at the time of submission of application form, a certificate of Medical fitness from a registered medical practitioner.

5. Admission to Bachelor of Clinical Optometry course shall be made on the basis of eligibility and an entrance test to be conducted for the purpose.

a) Entrance test, to be conducted by the university as per the syllabus under 10+2 scheme of National Board (CBSE/ State Board/ICSE/ NOS/ IGSCE). Successful candidates on the basis of written test will be called for the counseling. The counseling committee will include the Director of the Institute of Optometry (Chairman of the Board), senior faculty members along with other nominees, whose recommendations shall be final for the selection of the students.

b) During subsequent counseling(s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.

c) The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

2. Provision of Lateral Entry:

Lateral entry to second year of undergraduate optometry programme for candidates who have passed diploma program (Refraction or its equivalent) from the Government Boards and recognized by State/Central University, fulfilling the conditions specified and these students are eligible to take admission on lateral entry system only if the related subjects have been studied at diploma level.

3. Duration of the course

The B. Optometry undergraduate degree program is of four years (Total Eight semesters) duration (3+1) including one year of compulsory internship.

Duration of the course: 4 (3+1) years or 8 (6+2) semesters.

Semesters - An academic year consists of two semesters

Odd Semester: June/July to November/December

Even Semester: November/December to April/May

4. Medium of instruction

English shall be the medium of instruction for all the subjects of study and for examination of the course.

5. Attendance

A candidate has to secure minimum-

1. 75% attendance in theory
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

6. Competency Standards

Classification Units of Competency Skills at Entry level for optometrists

1. Communication Skills
2. Professional Conduct
3. Patient Examination and management.
4. Optical Dispensing
5. Documentation

For details refer to **IELOCSS** (Indian Entry Level Optometry Competency Skills Standards) document developed by **ASCO** (Association of Schools & Colleges of Optometry) India.

7. Scheme of Examination

(a) Internal Examinations (Theory + Practical + Viva)

1. There shall be two internal examinations (also called internal assessment tests I and II) of one hour duration for each course to be held as per the schedule fixed in the Academic Calendar.

2. A student can take for supplementary re-internal exam of a specific subject or all the subjects for the betterment of performance in case of scoring of less mark in previous internal assessment exams only after successful submission of an application to the class teacher which will be approved by Director/Principal of the institute.

(b) University Examination

University Theory Examination Pattern		
Section A		
MCQs	10 x 1 Mark each	10 Marks
Section B		
LAQs (Any 2 out of 3)	02 x 10 Marks each	20 Marks
Section C		
Short Questions (Any 4 out of 5)	04 x 05 Marks each	20 Marks
	Total	**50 Marks**

Total 100 Marks Combined Head of Passing

1. External Theory will carry **50 marks**
2. Internal Assessment (Theory + Practical) will carry total of **50 marks**

Break –Up

1. Final Theory University Exams 50 Marks
2. Internal Assessment Exams 50 Marks (40T+10V/P)
3. Grand Total = 100 Marks (Each Subject)

(c) Standard of Passing:

1. The standard of passing shall be minimum 50% in each subject.
2. The marks of all heads combined (University Theory Exam + Internal Assessment Theory + Practicals / Viva) shall be considered together for Passing of the candidate.

(d) Grace Marks

The grace marks up to a maximum of **FIVE (5)** marks may be awarded to a student who has failed in not more than two subjects in the respective semester. Provided that these grace marks shall be awarded only if the student passes after awarding these marks.

(e) Grading System

UGC 10-point Grading Scale

Marks	Letter Grade	Grade Point
90 To 100	**O** : Outstanding	10
80 To 89	**A+** : Excellent	9
70 To 79	**A** : Very Good	8
60 To 69	**B+** : Good	7
55 To 59	**B** : Average	6
50 To 54	**P** : Pass	5
00 To 49	**F** : Fail	0
-	**AB** : Absent	0

Computation of SGPA and CGPA

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i. The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.
SGPA (Si) = Σ(Ci x Gi) / ΣCi
where Ci is the number of credits of the course and Gi is the grade point scored by the student in the course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.
CGPA = Σ(Ci x Si) / Σ Ci
where Si is the SGPA of the semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Illustration of Computation of SGPA and CGPA and Format for Transcripts

i. **Computation of SGPA and CGPA**
Illustration for SGPA

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade
Course 1	**3**	**A**	8	3 X 8 = 24
Course 2	**4**	B+	7	4 X 7 = 28
Course 3	**3**	B	6	3 X 6 = 18
Course 4	**3**	O	10	3 X 10 = 30
Course 5	**3**	C	5	3 X 5 = ^{1}5
Course 6	**4**	B	6	4 X 6 = 24
	20			**139**

Thus, **SGPA** =139/20 = **6.95**

Illustration for **CGPA**

Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
Credit : 20 SGPA : 6.9	Credit : 22 SGPA : 7.8	Credit : 25 SGPA : 5.6	Credit : 26 SGPA : 6.0	Credit : 26 SGPA : 6.3	Credit : 25 SGPA : 8.0

Thus, **CGPA =**

$$\frac{20 \times 6.9 + 22 \times 7.8 + 25 \times 5.6 + 26 \times 6.0 + 26 \times 6.3 + 25 \times 8.0}{144} = \mathbf{6.73}$$

ii. **Transcript (Format):** Based on the above recommendations on Letter grades, grade points and SGPA and CCPA, the Institute may issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters.

(f) ATKT (Allowed-To-Keep-Terms)

1. A Student who has failed in 2 subjects or courses in respective academic year (Both Semesters combined) shall be allowed to keep term for next Semester respectively.

2. A student who failed more than two subjects or courses in whole academic year cannot be promoted to next academic year.

3. For enrolment in third year of B. Optom. program, a student must pass the university examinations of 1st & 2nd semesters of first year B. Optom. program and a student from second year B. Optom. program can be promoted to third year B. Optom. with not more than two subjects of second year B. Optom. (Both Semesters combined) as a backlog.

4. For enrolment in fourth year Internship program, a student must pass all three academic years of B. Optom. program.

(g) Research Project / Dissertation

1. The students shall carry out research project/clinical study in the Recognized Research Institute or Clinical Eye Hospital or Eye Clinics or Renowned Optical cum Clinical dispensing stores.

2. For Research Project the student guide ratio shall ordinarily be 5: 1 Ratio. In exceptional case the teacher may be permitted by the director to have more than 5 students but not more than 7 students.

3. The findings of the Research Project shall be presented in the form of a Dissertation, with the intention of acquainting the student in research methodology adopted while carrying out research in a particular subject and in scientific writing and in presentation skills.

4. The dissertation shall broadly comprise of General information, Abstract or Summary of the work, Technical information comprising Introduction including review of literature, Methodology, Results and Discussion, Literature cited and Conclusions and Future Prospects.

5. The technical data shall be supported with appropriate illustrations, photographs, statistical data and any other relevant documents.

6. The student shall carry out research and submit the dissertation, after completion of 9 months of internship. The institute shall appoint a committee or a designate teacher/guide to scrutinize the dissertation.

(h) Dissertation Evaluation and Final Year Internship Professional Examination

1. The Dissertation and Final Year Internship Professional Examination shall be evaluated for total 400 marks.
   100 Marks Theory
   150 Marks Project
   100 Marks Clinical & Technical Viva
   50 Marks for Case Work-Up

2. The committee of Research Guide, Internal examiner and External Examiner shall evaluate dissertation, presentation of the work, viva-voce, Written Exam, Live Case Work-up and Log-Book for 300 marks (150 Marks Project/ 100 Marks Clinical & Technical Viva/ 50 Marks for Case Work-Up)

3. The Internal and External Examiners will individually evaluate the student under the categories mentioned above for 300 marks.

4. The Performance of the student during internship shall be evaluated by conducting Theory MCQ's paper of 100 marks at the end of final year examination which includes all courses of optometry including practical's.

(i) Criteria for appointment of Examiner (Internal & External) and terms of their appointment.

1. Board of Studies of Optometry and Visual Sciences shall submit, to the Committee constituted by Board of Examinations, a panel of examiner names, along with their addresses, suitable for appointment as Internal and External Examiners.
2. Examiners shall be appointed by the Academic Council as per section 8(b) (viii) of the Rules of Dr. D. Y. Patil University on the recommendations of the Board of Examinations.
3. In case of refusal from the person so appointed, the Controller of Examinations shall appoint substitute examiners from the panel approved.
4. Internal and External Examiners: An "Internal Examiner" means a person who is a teacher in the constituent college(s) / institute(s) of the University. The teachers in other universities or recognized teacher of other University in the state or outside the state shall be referred to as the "External Examiner".
5. Intimation of appointment as the examiner shall be accompanied by a copy of the instructions/guidelines relating to the examination for he/she is appointed, as also the information regarding the remuneration he/she shall be entitled to draw, if he/she acts as examiner. He/She is expected to attend to and shall be required to send to the Controller of Examinations.
6. Examiners shall be appointed for examinations to be held in that academic year; however they shall be eligible for reappointment.
7. Relatives, Close Friends or next to the kin which are directly or indirectly related to the candidates shall not to be included.

RULES AND REGULATIONS / GUIDELINES FOR INTERNSHIP TRAINING

PROGRAM FINAL YEAR CANDIDATES OF B. OPTOM. (CLINICAL OPTOMETRY)

1. The students after successful completion the professional examinations for the Degree of Bachelor of Clinical Optometry as per the syllabi prescribed by the Dr. D. Y. Patil Vidyapeeth, Pune for First B. Optom., Second B. Optom. and Third B. Optom. Final Year shall undergo one year of compulsory rotatory internship training program for the Fourth year to develop skill and acquire clinical knowledge with proficiency in managing patient independently.

2. The evaluation of the interns shall be done very carefully by the In - charge, Internship Training Program and the Head of the concerned department on the basis of the skill, knowledge and ability to handle the cases independently. The Director / Principal of the college shall have to monitor Internship Training Program in collaboration with all Heads of the Departments. The Incharge, Internship Training Program, Heads of the Departments and the In-charge / off-campus Optometry In-charge of the institution shall be responsible for the maintenance of standard and records of the intern's on-Campus and off-Campus. Any deviation / alteration in the training program without the knowledge of the Dr. D. Y. Patil Institute of Optometry shall not be permit under any circumstances and shall not accept any responsibility in respect of any deviation/alteration in the training program.

The program of internship shall be as under: **GENERAL –**

1. Internship is a phase of mandatory training, on full time basis, where in a candidate is expected to conduct actual Clinical Optometry practice, with fair independence in clinical decision making in low task cases whereas to work under supervision at high task areas so that at the end of Internship he/she is capable to practice Optometry profession independently.

2. Since Optometry profession does not have a Council to regulate the education, till such Council is formed; the Rules and Regulations recommended by the Indian Optometric Association [I.O.A.] affiliated to the World Council of Optometry (W.C.O.) and regulating body (A.S.C.O.) which is accepted by the University shall be implemented. The Internship programme shall mainly focus on acquisition of specific skills listed in the major areas of training by "hands on" experience and also on ability to conduct successfully a scientific project during this period.

3. The off-campus Optometry In-charge of the college / Hospital / Optical Outlet shall be responsible for implementation of Internship programme and also for the issue of Internship completion certificate.

4. The Internship staff In-Charge shall be responsible for the maintenance of the standard and the records of the interns. Internship shall commence not later than One week from the day of declaration of results of IIIrd year VI semester examination.

5. It shall be binding on the candidate to follow strictly, the code of conduct prescribed by the I.O.A, A.S.C.O. and accepted by the University. Any breach in the conduct / discipline shall disqualify the candidate from pursuing Internship for a period of One week to One month or more depending upon the gravity of breach of conduct. Stipend is recommended during the Internship.

6. Compulsory Internship shall include rotational clinical assignments, administrative skills and a scientific project over a period of 52 weeks. On successful completion of Internship, to the satisfaction of the Heads of various Dept. of and the Dean/Principal of the college the Internship completion certificate shall be issued by the college and it will be forwarded to the University for the award of B. Optom. (Clinical Optometry) Degree.

OBJECTIVES –

At the end of Internship program, the candidate shall be able to-

1. Correction of Refractive errors of the Eye and Prescription for the Spectacles.

2. Thorough Detection of Ocular Diseases related to Systemic and Neurological diseases with aid and knowledge of latest Hi-tech. Medical Equipments.

3. Designing and fitting of contact lenses, specialized custom lens for computers application and training and use for Low Vision Patient / AIDS and their Rehabilitation.

4. Diagnosis and Clinical Orthoptics treatment, home exercises for Oculomotor malfunctions such as heterophoria and strabismus.

5. Primary eye care services and vision screening in schools, colleges, urban slums, rural areas and occupational Optometry in industries.

6. Optometric counseling of patients with Partial sight, color blindness and hereditary vision defects.

7. Evaluation of health status and pathological conditions of the eye and visual system and referral of patients to specialist at the appropriate stages.

8. Artificial Eyes dispensing and designing of Ocular prosthesis.

START OF INTERNSHIP PROGRAMME :

The program will commence within 1st week of July/August of the same academic year after the declaration of IIIrd Year B. Optom. (Clinical Optometry) result by the Vidyapeeth. Before commencement of the Internship Training Program, the Principal and Internship program Staff incharge shall conduct one day Orientation program to orient the internees to get acquainted with the details of Internship Training Program. The Orientation program shall cover in brief topics like Logbook and recording of patient details, Research and Project methodology, Hands-on clinical practice, Medico-legal issues, Rehabilitation of patients, Mandatory Skills to be acquired, Social and ethical aspects, Patient Management. It shall be mandatory for the internees to attend the Orientation program. The period of one day will taken as separate training day in the period of 1 Year Internship (12 months clinical internship or 9 months clinical + 3 months optical dispensing internship).

INTERNSHIP SCHEDULE -

Candidate shall be posted to six Rotational Clinical assignments of total 52 Weeks, including administrative skills pertaining to Optometry practice.

Sr. No.	**Placement**
1	Refraction and Ophthalmic Dispensing Optics
2	Contact Lens and Specialized Advance Fittings
3	Orthoptics and Binocular Vision
4	Low Vision Subjects and Aids
5	Anterior Segment Examination and Diseases
6	Retina & Posterior Segment

DURING THE INTERNSHIP, STUDENT MUST CONDUCT FOLLOWING PROCEDURES –

1] Refraction and Ophthalmic Dispensing Optics-

Trail sets components uses and application, JCC Test, Stenopic slit and pin-hole uses and application of contrast sensitivity and color vision tests, Stereo-Acuity and Brightness acuity Tests, Macular function and other specialized tests.

2] Objective Refraction and other tests.

Retinoscopy-Wet and Dry type, Direct and In-Direct Retinoscopy, Various type of Retinoscopy Techniques, Auto-refraction, Keratometer and automated devices, Perimetry, Corneal Topography assessment technique and measurements, Tonometry and various techniques, Aesthsiometery etc.

3] Specialized procedure-Orthoptics and Binocular Vision therapy

Fully able to apply the use of Synaptophore machine in clinics, Prism bar, Maddox Rod, Wing and IPD and RAF ruler applications, Cam Stimulator, Prisms and filters tests etc.

4] Specialized procedures-Contact lens and Contrast Sensitivity

Slit –lamp Observation Techniques, Keratometer, Burton Lamp technique, Computerized Topography, spectrometry, Tear Film Assessment tests and various fitting techniques and methodology for Soft and RGP lens, Keratoconus fittings, Monovision C. L. Fittings, Toric C. L. Fittings and other specialized fittings

5] Specialized procedures- Low Vision Aids and Evaluation

Latest instruments in L.V.A-Optical, electro-optical and Non Optical AIDS Various Methods with Psychology for assessment and treatment with Rehabilitation Protocol and Follow-up Regimen

6] Community Optometry and Nutrition-

Vision screening and analysis and treatment in the form Glasses and other aids for achieving National Programme of blind of VISION2020

a] Collect, analyze, interpret and present simple community and hospital based data,

b] participate as a member in copartnership in the Vision Rehabilitation work in community

c] participate in the programmes in prevention and control of locally prevalent Eye disorders,

d] be capable of conducting survey and employ its findings as a measures towards arriving at Ocular and systemic functional diagnosis

e] Provide Nutritional and Ocular education to an all.

TO ASSIST IN PROCEDURES -

1] Minor Eye Operations and Ocular Prosthesis and management
2] Sports Vision and therapy.
3] Computer vision syndrome management
4] Disaster management and Industrial Eye wear designing and Protection.

EVALUATION SCHEME –

Skills during Clinical Objective and Social Subjective Evaluation shall include following of all the above mentioned major subjects for clinical skills and applications for the same in various set -ups rural and urban Optometry and Ophthalmic centers alike.

LEAVE FOR INTERNS -

An internee shall be entitled for maximum 12 days leave during 1 year period of internship posting. An internee will not be permitted to avail more than 2 days leave in any department. Period of leave in excess of 2 days in a department will have to be repeated in the same department. Under any circumstances this period will not be condoned by any authority.

CBCS PATTERN SYLLABUS FOR B. OPTOMETRY

B. OPTOM. 1st YEAR, 1st SEMESTER CREDITS

Paper	Course Code	Course Title	Theory/ Lecture (Hours)	Cre-dits	Practicals/ Clinical Rotation (Hours)	Cre-dits	Total Hours	Total Credit Points	Scheme of Examination		
									Internal Assessment Marks	Univer-sity Marks	Total Marks
1	BOPT 101	General Anatomy	45	3	30	1	75	4	50	50	100
2	BOPT 102	General Physiology	45	3	30	1	75	4	50	50	100
3	BOPT 103	Basic Optics (Physical & Geometrical Optics)	60	4	30	1	90	5	50	50	100
4	BOPT 104	Dispensing Optics-I	60	4	30	1	90	5	50	50	100
5	BOPT 105	English & Communi-cation Skills	30	2	0	0	30	2	100	0	100
#	BOPT 106	Gender Sensitization	15	0	0	0	15	0	0	0	0
	Total		**240+15***	**16**	**120**	**4**	**375**	**20**	**300**	**200**	**500**

B. OPTOM. 1st YEAR, 2nd SEMESTER CREDITS

Paper	Course Code	Course Title	Theory/ Lecture (Hours)	Cre-dits	Practicals/ Clinical Rotation (Hours)	Cre-dits	Total Hours	Total Credit Points	Scheme of Examination		
									Internal Assessment Marks	Univer-sity Marks	Total Marks
1	BOPT 201	Ocular Anatomy & Ocular Physiology	60	4	30	1	90	5	50	50	100
2	BOPT 202	Basic Biochemistry & Basic Pharmacology	60	4	30	1	90	5	50	50	100
3	BOPT 203	Basic Pathology & Basic Microbiology	60	4	30	1	90	5	50	50	100
4	BOPT 204	Ophthalmic Optics	45	3	30	1	75	4	50	50	100
5	BOPT 205	Computer for Optometry	0	0	30	1	30	1	100	0	100
	Total		**225**	**15**	**150**	**5**	**375**	**20**	**300**	**200**	**500**

B. OPTOM. 2nd YEAR, 3rd SEMESTER CREDITS

Paper	Course Code	Course Title	Theory/ Lecture (Hours)	Cre-dits	Practicals/ Clinical Rotation (Hours)	Cre-dits	Total Hours	Total Credit Points	Scheme of Examination		
									Internal Assessment Marks	Univer-sity Marks	Total Marks
1	BOPT 301	Visual Optics-I & Optometric Instruments	60	4	60	2	120	6	50	50	100
2	BOPT 302	Dispensing Optics-II	45	3	30	1	75	4	50	50	100
3	BOPT 303	Ocular Disease-I & Clinical Examination of Eye	60	4	60	2	120	6	50	50	100
4	BOPT 304	Indian Medicine & Telemedicine	30	2	0	0	30	2	100	0	100
5	BOPT 305	Clinical Optometry - I	0	0	60	2	60	2	0	100	100
		Total	**195**	**13**	**210**	**7**	**405**	**20**	**250**	**250**	**500**

B. OPTOM. 2nd YEAR, 4th SEMESTER CREDITS

Paper	Course Code	Course Title	Theory/ Lecture (Hours)	Cre-dits	Practicals / Clinical Rotation (Hours)	Cre-dits	Total Hours	Total Credit Points	Scheme of Examination		
									Internal Assessment Marks	Univer-sity Marks	Total Marks
1	BOPT 401	Visual Optics-II	45	3	30	1	75	4	50	50	100
2	BOPT 402	Optometric Investigation	45	3	30	1	75	4	50	50	100
3	BOPT 403	Optometric Optics	45	3	30	1	75	4	50	50	100
4	BOPT 404	Low Vision Aids	45	3	30	1	75	4	50	50	100
5	BOPT 405	Ocular Diseases-II	45	3	30	1	75	4	50	50	100
#	BOPT 406	Environmental Sciences	15	0	30	0	45	0	0	0	0
		Total	**225+15***	**15**	**150+30***	**5**	**420**	**20**	**250**	**250**	**500**

B. OPTOM. 3rd YEAR, 5th SEMESTER CREDITS

Paper	Course Code	Course Title	Theory/ Lecture (Hours)	Credits	Practicals/ Clinical Rotation (Hours)	Credits	Total Hours	Total Credit Points	Scheme of Examination		
									Internal Assessment Marks	University Marks	Total Marks
1	BOPT 501	Contact Lens-I	60	4	30	1	90	5	50	50	100
2	BOPT 502	Orthoptics and Binocular Vision	60	4	30	1	90	5	50	50	100
3	BOPT 503	Major Eye Diseases & Systemic Diseases	60	4	60	2	120	6	50	50	100
4	BOPT 504	Public Health & Community Optometry	30	2	0	0	30	2	50	50	100
5	BOPT 505	Research Methodology & Biostatistics	30	2	0	0	30	2	50	50	100
	Total		**240**	**16**	**120**	**4**	**360**	**20**	**250**	**250**	**500**

B. OPTOM. 3rd YEAR, 6th SEMESTER CREDITS

Paper	Course Code	Course Title	Theory/ Lecture (Hours)	Credits	Practicals/ Clinical Rotation (Hours)	Credits	Total Hours	Total Credit Points	Scheme of Examination		
									Internal Assessment Marks	University Marks	Total Marks
1	BOPT 601	Contact Lens-II	45	3	30	1	75	4	50	50	100
2	BOPT 602	Advance Orthoptics	45	3	30	1	75	4	50	50	100
3	BOPT 603	Applied Optometry (Pediatric, Occupational & Geriatric Optometry)	90	6	60	2	150	8	50	50	100
4	BOPT 604 A	Basic Accountancy	15	1	0	0	15	1	50	0	50
	BOPT 604 B	Law for Optometry	15	1	0	0	15	1	50	0	50
5	BOPT 605 A	Medical Psychology	15	1	0	0	15	1	50	0	50
	BOPT 605 B	Hospital Procedures and Public Relations	15	1	0	0	15	1	50	0	50
	Total		**240**	**16**	**120**	**4**	**360**	**20**	**350**	**150**	**500**

B. OPTOM. 4th YEAR, 7th & 8th SEMESTER CREDITS

Paper	Course Code	Course Title	Theory/ Lecture (Hours)	Cre-dits	Practicals/ Clinical Rotation (Hours)	Cre-dits	Total Hours	Total Credit Points	Scheme of Examination		
									Internal Assessment Marks	Univer-sity Marks	Total Marks
1	BOPT 701	B. Optom. Internship (Written Exam)	0	0	600	20	600	20	0	100	100
2	BOPT 702	B. Optom. Internship (Clinical Technical Viva)	0	0	600	20	600	20	0	100	100
3	BOPT 703	Research Project (Project Presentation Dissertation Log)	0	0	120	4	120	4	0	100	100
4	BOPT 704	Research Project (Case Workup)	0	0	120	4	120	4	0	100	100
	Total	**0**	**0**	**1440**	**48**	**1440**	**48**	**0**	**400**	**400**	
	Theory Grand Total		**1365+30***	**91**	**2310+30***	**77**	**3675+ 60***	**168**	**1700**	**1700**	**3400**

B. Optom. Total 168 Credits

1 Credit = 15 Hrs. of Theory Lectures

0.5 Credit = 15 Hrs of Practical Sessions

Mark Indicates Audit Course for which there is no assessment

* Total Audit Course Hours 60 which are non-creditable

FIRST YEAR
FIRST SEMESTER

BACHELOR OF OPTOMETRY

1st YEAR, 1st SEMESTER
BOPT 101 : GENERAL ANATOMY

- **Course Description**:
  General anatomy deals with the entire human anatomy with emphasis on different tissues, blood vessels, glands, nerves and the entire central nervous system in particular.

- **Course Objectives:**
  At the end of the semester, the student should be able to:

  1. Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the human body.

  2. Identify the microscopic structures of various tissues and organs in the human body and correlate the structure with the functions.

  3. Comprehend the basic structure and connections between the various parts of the central nervous system so as to analyze the integrative and regulative functions on the organs and systems.

- **Text Books:-**
  1. Mariano S. H. Difiore: Atlas of Human Histology, 5th edition 1981, Lea and Feliger.

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

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

- **Reference Books:-**
  1. Peter L. Williams And Roger Warwick: - Gray's Anatomy - Descriptive and Applied, 36th edition, 1980, Churchill Livingstone.

  2. T. S. Ranganathan: Text book of Human Anatomy, 1982, S. Chand & Co., New Delhi 110 055.

  3. Inderbir Singh: Human Embryology, 3rd edition, Macmillan India, 1981.

  4. R. Kanagasuntharam, P. Sivananda-Singham & A. Krishnamurti: Anatomy- Regional, Functional & Clinical, P. G. Publisher, Singapore 1987.

- **Course Plan:**
  1. Introduction to Human Anatomy:
     Anatomy: Definition and its relevance in medicine and optometry Planes of the body, relationship of structures, organ system.
  2. Skeleton System
  3. Tissues of the Body:

     Epithelium, connective tissue, bone and cartilage, Embryology, histology, different types of each of them, types of cells, cellular differentiation and arrangements in different tissues.
  4. Muscles:
     Different types of muscles, their functional differentiation, their relationship with different structures, their neural supply.
  5. Blood vessels:
     Differentiation between arteries and veins, embryology, histology of both arteries and veins, Functional differences between the two, anatomical differences at different locations.
  6. Skin and appendages:
     Embryology, anatomical differences in different areas, functional and protective variations, innervations, relationship with muscles and nerves.
  7. Lymphatic system:
     Embryology, functions, relationship with blood vessels and organs.
  8. Glands:
     Embryology, different types of glands (exocrine and endocrine), functional differences, neural control of glands.
  9. Nervous system:
     Parts of Nervous system, cell types of nervous system, Blood-brain barrier, Reflex arc, Peripheral Nerves, Spinal nerves, Nerve fibers, Autonomic Nervous system.
  10. Brain and Cranial nerves:
      Major parts of Brain, Protective coverings of the Brain, Cerebrospinal Fluid, Brain stem, Cerebellum, Diencephalon, Cerebrum, Cranial nerves.

- **Practical:** Practical demonstration of each organ using specimen. If specimen for certain organs are not available, then videos can be shown to make the student understand the anatomic structures.

BOPT 102 : GENERAL PHYSIOLOGY

- **Course Description**:
  General physiology deals with the entire human anatomy with emphasis on different organ systems, their physiological functions with special emphasis on blood and neuro physiology.

- **Course Objectives**:
  At the end of the course the student will be able to:
  1. Explain the normal functioning of various organ systems of the body and their interactions.
  2. Elucidate the physiological aspects of normal growth and development.
  3. Describe the physiological response and adaptations to environmental stresses.
  4. Know the physiological principles underlying pathogenesis of disease.

- **Text Books:-**
  1. L. Prakasam reddy, Fundamentals of Medical Physiology, 4th edition, Paras medical Publisher, Hyderabad, 2008
  2. Sujit K. Chaudhuri, Concise Medical Physiology, 6th edition, New Central Book Agency, Kolkata, 2008

- **Reference Books:-**
  1. A. K. Khurana, Indu Khurana: Anatomy and Physiology of Eye, 2nd edition, CBS Publishers, New Delhi, 2006.
  2. A. C. Guyton: Text book of Medical Physiology, 8th edition, saunders company, Japan.
  3. G. J. Tortora, B Derrickson: Principles of anatomy & physiology,11th edition, Harper & Row Publishers, New York.
  4. John Wiley & Sons Inc, New Jersey, 2007.

- **Course Plan:**
  1. Cell Structure & Organization
     Tissue organization
     Epithelium
     Connective tissue –Collagen fibers –Elastic fibers –Areolar fibers
     Cartilage –Bone
     Contractile tissue –striated –skeletal –cardiac –non striated –plain –myoepithelial
     General principles of cell physiology
     Physiology of skeletal muscle

  2. Blood:
     Composition
     Volume measurement & variations
     Plasma proteins –classification & functions
     Red blood cells –development, morphology & measurements –functions & dysfunctions.
     White blood cells –development –classification, morphology –functions & dysfunctions
     Platelets –morphology –development, functions & dysfunctions
     Clotting –factors –mechanism –anti- coagulants dysfunctions
     Blood grouping –classification –importance in transfusion, Rh factor & incompatibility
     Suspension stability
     Osmotic stability
     Reticulo endothelial system
     - Spleen
     - lymphatic tissue
     - Thymus
     - bone marrow
     - immune system
     - cellular
     - Humoral
     - Autoimmune

  3. Digestion:
     General arrangement
     Salivary digestion –functions & regulations
     Gastric digestion –functions & regulations
     Pancreatic digestion –functions & regulations
     Intestinal digestion –functions & regulations

Liver & bile
Absorption
Motility
Deglutition
Vomiting
Defecation
Functions of large intestine
Neurohumoral regulations of alimentary functions, summary

4. Excretion:
   Body fluids –distribution, measurement & exchange, Kidney – structure of nephron –mechanism of urine formation –composition of the urine and abnormal constituents –urinary bladder & micturition

5. Endocrines:
   Hormone mechanism –negative feed backs –tropic action –permissive action – cellular action, hypothalamic regulation
   Thyroid - hormones, actions, regulations
   Adrenal cortex - hormones, actions, regulations
   Adrenal medulla –hormones, actions, regulations
   Parathyroid - hormones, actions, regulations
   Islets of pancreas –hormones, actions, regulations
   Miscellaneous hormones, actions, regulations
   Common clinical disorders

6. Reproduction:
   Male reproductive system –control & regulation

   Female reproductive system –uterus –ovaries –menstrual cycle – regulation–

   pregnancy & delivery –breast –family planning

7. Respiration:
   Mechanics of respiration –pulmonary function tests –transport of respiratory gases- neural and chemical regulation of respiration – hypoxia, cyanosis, dyspnoea– asphyxia

8. Circulation:
   General principles
   Heart: myocardium –innervation –transmission of cardiac impulse- Events during cardiac cycle –cardiac output. Peripheral circulation: peripheral resistances –arterial blood pressure –measurements –factors regulation variations –capillary circulation – venous circulation. Special circulation: coronary cerebral –miscellaneous

9. Environmental Physiology
   Body temperature regulation (including skin Physiology). Exposure to low and high atmospheric pressure

10. Nervous System:
    Neuron –Conduction of impulse –synapse –receptor.
    Sensory organization –pathways and perception
    Reflexes –cerebral cortex –functions. Thalamus –Basal ganglia Cerebellum.
    Hypothalamus.
    Autonomic nervous system –motor control of movements, posture and equilibrium – conditioned reflex, eye hand co-ordination

11. Special Senses –(Elementary) Olfaction –Taste –Hearing

- **Practicals**

1. Blood test: Microscope, Haemocytometer, Blood, RBC count, Hb, WBC count, Differential Count, Haematocrit demonstration, ESR, Blood group & Rh. type, Bleeding time and clotting time

2. Digestion: Test salivary digestions

3. Excretion: Examination of Urine, Specific gravity, Albumin, Sugar, Microscopic examination for cells and cysts

4. Endocrinology and Reproduction: Dry experiments in the form of cases showing different endocrine disorders.

5. Respiratory System: Clinical examination of respiratory system, Spirometry, Breath holding test

6. Cardio Vascular System: Clinical examination of circulatory system, Measurement of blood pressure and pulse rate, Effect of exercise on blood pressure and pulse rate

7. Central Nervous System: Sensory system, Motor system, Cranial system, Superficial and deep reflexes

BOPT 103 : BASIC OPTICS
(PHYSICAL OPTICS & GEOMETRICAL OPTICS)

PHYSICAL OPTICS

- **Course Description**:
  This course will be taught in one semester. Physical Optics is the 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 Objectives**:
  The objective of this course is to equip the students with a thorough knowledge of properties of light. At the end of this course, students will be able to predict the distribution of light under various conditions.

- **Text Book**:
  Subrahmanyan N. BrijLal, A text book of Optics, S. Chand Co. Ltd., New Delhi, India, 2003.

- **Reference Books**:
  1. Pedrotti L. S., Pedrotti Sr. F. L., Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
  2. Keating NM. P., Geometric, Physical and Visual Optics, Butterworth-Heinemann, Massachusetts, USA, 2002.

- **Course Plan**
  1. 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.
  2. Sources of light; Electromagnetic Spectrum.
  3. Polarized light; linearly polarized light; and circularly polarized light.
  4. Intensity of polarized light; Malus'Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle.
  5. Birefringence; ordinary and extraordinary rays.
  6. Relationship between amplitude and intensity.
  7. Coherence; interference; constructive interference, destructive interference; fringes; fringe width.
  8. Double slits, multiple slits, gratings.
  9. Diffraction; diffraction by a circular aperture; Airy's disc.

10. Resolution of an instrument (telescope, for example); Raleigh's criterion.
11. Scattering; Raleigh's scattering; Tyndall effect.
12. Fluorescence and Phosphorescence
13. Basics of Lasers –coherence; population inversion; spontaneous emission; Einstein's theory of lasers.
14. Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy curves; photometric units
15. Inverse square law of photometry; Lambert's law.
16. Other units of light measurement; retinal illumination; Trolands

- **Practical:**
  Each practical session could be evaluated for 10 marks and the total could be added to the final evaluations. These practical could be customized as per the university requirements and spaced apart conveniently. The practical to be done include the following:
  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.

GEOMETRICAL OPTICS-

- **Course Description**: This course will be taught in two consecutive semesters. Geometric Optics is the study of light and its behaviour as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail. Reflections at plane and spherical surfaces and refractions at plane, spherical, cylindrical and toric surfaces will be studied in this course. Attention will be given to the system of surfaces and/or lenses and their imaging properties. The effect of aperture stops on the quality of images, such as blur and aberrations, depth of field and depth of focus, will also be studied.

- **Course Objectives**: The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

- **Text Book:**
  1. Tunnacliffe A. H., Hirst J. G., Optics, The association of British Dispensing Opticians, London, U.K., 1990.
  2. Pedrotti L. S., Pedrotti Sr. F. L., Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

- **Reference Books:**
  1. Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
  2. Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

- **Course Plan:**
  1. Nature of light –light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; refractive index.
  2. Wavefronts–spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence; vergence at a distance
  3. Refractive index; its dependence on wavelength
  4. Fermat's and Huygen's Principle –Derivation of laws of reflection and refraction (Snell's law) from these principles
  5. Plane mirrors –height of the mirror; rotation of the mirror
  6. Reflection by a spherical mirror –paraxial approximation; sign convention; derivation of vergence equation
  7. Imaging by concave mirror, convex mirror
  8. Reflectivity; transmissivity; Snell's Law, Refraction at a p
  9. Glass slab; displacement without deviation; displacement without dispersion
  10. Thick prisms; angle of prism; deviation produced by a prism; refractive index of the prism
  11. Prisms; angular dispersion; dispersive power; Abbe's number.
  12. Definition of crown and flint glasses; materials of high refractive index

13. Thin prism –definition; definition of Prism diopter; deviation produced by a thin prism; it dependence on refractive index
14. Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula
15. Paraxial approximation; derivation of vergence equation
16. Imaging by a positive powered surface and negative powered surface
17. Vergence at a distance formula; effectivity of a refracting surface
18. Definition of a lens as a combination of two surfaces; different types of lens shapes.
19. 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
20. Newton's formula; linear magnification; angular magnification
21. Nodal Planes
22. Thin lens as a special case of thick lens; review of sign convention
23. Imaging by a thin convex lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions
24. Imaging by a thin concave lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions
25. Prentice's Rule
26. System of two thin lenses; review of front and back vertex powers and equivalent power, review of six cardinal points.
27. System of more than two thin lenses; calculation of equivalent power using magnification formula

- **Practical**
  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.

BOPT 104 : DISPENSING OPTICS –I

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

- **Course Objectives:**
  Skills/knowledge to be acquired at the end of this course:
  1. To select the tool power for grinding process
  2. Different types of materials used to make lenses and its characteristics
  3. Lens designs–Bifocals, progressive lens
  4. Tinted, Protective & Special lenses
  5. Spectacle frames –manufacture process & materials
  6. Art and science of dispensing spectacle lens and frames based on the glass prescription.
  7. Reading of spectacle prescription. Counselling the patient
  8. Lens edge thickness calculation
  9. Frame & lens measurements and selection
  10. Writing spectacle lens order
  11. Facial measurements - Interpupillary distance measurement and measuring heights (single vision, multifocal, progressives)
  12. Lens verification and axis marking and fitting of all lens types
  13. Final checking of finished spectacle with frame adjustments
  14. Delivery and follow-up
  15. Troubleshooting complaints and handling patient's questions

- **Text Book/Reference Books:**

  1. Jalie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth – Heinemann, 2008
  2. Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth -Heinemann, 1996
  3. C. W. Brooks, I. M. Borish: System for Ophthalmic Dispensing, 3rd edition, Butterworth -Heinemann, 2007
  4. Michael P Keating: Geometric, Phisical& Visual Optics, 2nd edition, Butterworth –Heinemann, 2002

- **Course Plan**
  1. Introduction – light, mirror, reflection, refraction & absorption
  2. Definitions- Prisms, Lenses, Frames, Spectacles
  3. Prisms- definition, Properties, Refraction through prisms units
  4. Prisms- uses of prisms, Nomenclature prisms
  5. Thickness difference and base-apex notation
  6. Sign Conventions
  7. Lenses- Definition, Terminology used to describe lenses
  8. Form of Lenses- Convex lenses& Concave lenses
  9. Refraction and image formation through convex and concave lenses
  10. Determination of focal length and dioptric power of lens
  11. Surface power and radius/ refractive index values
  12. Vertex distance and vertex power
  13. Effectivity and effective powers
  14. Lens shape size, Types i.e. Spherical, Cylindrical, Sphero- cylindrical
  15. Toric surfaces and their significance, Toric lenses
  16. Sturm's conoid
  17. Neutralization of lenses
  18. Spherometer & sag formula
  19. Foci meter- power of lens and prisms
  20. Center marking and Axis marking by foci meter
  21. Simple Transposition
  22. Toric Transposition
  23. Prismatic effect, Centration, decentration, Prentice's rule
  24. Prismatic effect of sphero- cylinders and Plano cylinders
  25. Differential prismatic effects
  26. Decentration of lenses and edge thickness
  27. Decentration- examples
  28. Components and interpretation of spectacle prescription
  29. Prescription mistakes commonly made
  30. Prismatic effect of sphero- cylindrical lenses
  31. Aberrations in Ophthalmic lenses
  32. Tilt induced power in spectacle lenses
  33. Magnification in high plus lenses
  34. Minification in high minus lenses

- **Ophthalmic Lenses Types, Manufacturing, Workshop Practice**
  1. Prescription laboratory in action
  2. Instruments for making lenses
  3. Outline of lens surfacing and polishing
  4. Recording and ordering of ophthalmic lenses
  5. Terminology used in Lens workshops
  6. Ophthalmic raw materials- history and general outline
  7. Manufacturing of Ophthalmic blanks- Glass
  8. Glass lenses- material types and characteristics
  9. Glass working- spherical surfaces
  10. Glass working- Toric and A spherical
  11. ISI Standards for lenses
  12. Ophthalmic lens designs- best form lenses
  13. Design of high-powered lenses
  14. Bifocal design and manufacture
  15. Faults in lenses- description
  16. Faults in lenses- detection

- **Spectacle Frames- Theory basics (I)**
  1. History of spectacles
  2. Nomenclature and terminology
  3. Types and Parts of spectacle frames
  4. Spectacle frames- sides and joints
  5. Spectacle frame bridge
  6. Shapes of spectacle frames- advantages and disadvantages
  7. Spectacle frame measurements and markings

BOPT 105 : ENGLISH AND COMMUNICATION

- **Course Description**:
  This course deals with essential functional English aspects and nuances of the communication skills essential for the health care professionals.

- **Course Objectives**:
  1. This course trains the students in oral presentations, expository writing, logical organization and structural support.
  2. By acquiring skills in the use of communication techniques the students will be able to express better, grow personally and professionally, develop poise and confidence and achieve success.

- **Text Book:**
  1. Graham Lock, Functional English Grammar: Introduction to second Language Teachers.Cambridge University Press, New York, 1996.
  2. Gwen Van Servellen. Communication for Health care professionals: Concepts, practice andevidence, Jones & Bartlett Publications , USA, 2009.

- **Reference Books:** Faculty may decide.

- **Course Plan**

Functional English	**Topics**
Unit 1 Basics of Grammar	Vocabulary Synonyms, Antonyms, Prefix and Suffix, Homonyms, Analogies and Portmanteau words
Unit II Basics of Grammar – Part II	Active, Passive, Direct and Indirect speech, Prepositions, Conjunctions and Euphemisms
Unit III Writing Skills	Letter Writing, Email, Essay, Articles, Memos, one word substitutes, note making and Comprehension
Unit IV Writing and Reading	Summary writing, Creative writing, newspaper reading
Unit V Practical Exercise	Formal speech, Phonetics, semantics and pronunciation

Communication	**Topics**
Introduction	• Communication process. • Elements of communication • Barriers of communication and how to overcome them. • Nuances for communicating with patients and their attenders in hospitals
Speaking	• Importance of speaking efficiently • Voice culture. • Preparation of speech. Secrets of good delivery • Audience psychology, handling • Presentation skills. • Individual feedback for each student • Conference/Interview technique
Listening	• Importance of listening • Self-assessment • Action plan execution. • Barriers in listening. • Good and persuasive listening
Reading	• What is efficient and fast reading • Awareness of existing reading habits • Tested techniques for improving speed • Improving concentration and comprehension through systematic study.
Non Verbal Communication	• Basics of non-verbal communication • Rapport building skills using neuro- linguistic programming (NLP)
Communication in Optometry practice	

BOPT 106 : GENDER SENSITIZATION

- **Course Objectives:**
  1. To develop students' sensibility with regard to issues of gender in contemporary India.
  2. To provide a critical perspective on the socialization of men and women.
  3. To introduce students to information about some key biological aspects of genders.
  4. To expose the students to debates on the politics and economics of work.
  5. To help students reflect critically on gender violence.
  6. To expose students to more egalitarian interactions between men and women

- **Course Outcome**
  1. Students will have better understanding of important issues related to gender in contemporary India
  2. Student will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
  3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
  4. Students will acquire insight into the gendered division of labour and its relation to politics and economics
  5. Men and women students and professionals will be better equipped to work and live together as equals
  6. Students will develop a sense of appreciation of women in all walk of life.
  7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

- **Text & Reference books:**
  1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan – Penguin Books, 2012
  2. Abdulali Sohaila. "I Fought For My Life and Won" Available online at: http:// www. thealternative.in / lifestyle / i-fought-for-my- lifeand-won-sohaila- abdulal

- **Course Plan**

1. Understanding gender:
Gender: why should we study it? (Towards a world of equals: unit -1) Socialization: making women, making men (towards a world of equals: unit -2) introduction. Preparing for womanhood. Growing up male. First Lessons in caste. Different masculinities.

2. Gender and biology missing women:
Sex selection and its consequences, declining sex ratio. Demographic Consequences. Gender spectrum: beyond the binary, two or many? Struggles with discrimination.

3. Gender and labour housework:
The invisible labor "my mother doesn't work." "share the load." Women's work: its politics and economics fact and fiction. Unrecognized And unaccounted work. Additional reading: wages and conditions of work.

4. Issues of violence sexual harassment:
Say no, sexual harassment, not eve-teasing- coping with everyday Harassment- further reading: "chupulu". Domestic violence: speaking Out, is home a safe place? -when women unite [film]. Rebuilding lives. Additional reading: new forums for justice. Thinking about sexual Violence, blaming the victim-"i fought for my life…." – additional Reading: the caste face of violence.

5. Gender: co – existence just relationships:
Being together as equals, mary kom and onler. Love and acid just do not Mix. Love letters. Mothers and fathers. Additional reading: rosa parks-The brave heart. Prescribed textbook: all the five units in the textbook, "towards a world of Equals: a bilingual textbook on gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad, Telangana state in the year 2015.

FIRST YEAR
SECOND SEMESTER

B. OPTOM. 1st YEAR, 2nd SEMESTER

BOPT 201 : OCULAR ANATOMY & PHYSIOLOGY

OCULAR ANATOMY

- **Course Description**:
  This course deals with detailed anatomy of the orbit, eyeball and cranial nerves associated with ocular functions.

- **Course Objectives**:
  At the end of the course, the student should be able to:
  1. Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of various structures in the eye and adnexa.
  2. Identify the microscopic structures of various tissues in the eye and correlate the structure with the functions.
  3. Comprehend the basic structure and connections between the various parts of the central nervous system and the eye so as to understand the neural connections and distribution.
  4. To understand the basic principles of ocular embryology.

- **Text Book**:
  L. A. Remington: Clinical Anatomy of the Visual System, 2nd edition, Elsevier Butterworth Heinemann, Missouri, USA, 2005.

- **Reference Books**:
  A. K. Khurana, Indu Khurana: Anatomy and Physiology of Eye, 2nd edition, CBS Publishers, New Delhi, 2006.

- **Course Plan**
  1. Central nervous system:
     1.1 Spinal cord and brain stem
     1.2 Cerebellum
     1.3 Cerebrum
  2. Orbit
     2.1 Eye
     2.2 Sclera
     2.3 Cornea
     2.4 Choroid
     2.5 Ciliary body
     2.6 Iris
     2.7 Retina

3. Refractory media-
   3.1 Aqueous humor
   3.2 Anterior chamber
   3.3 Posterior chamber
   3.4 Lens
   3.5 Vitreous body
4. Eyelids
5. Conjunctiva
6. Embryology

- **Practical**
  1. Eye: Practical dissection of bull's eye
  2. Orbit: Practical demonstration of orbital structures.

OCULAR PHYSIOLOGY

- **Course Description:** Ocular physiology deals with the physiological functions of each part of the eye.
- **Course Objectives:**
  At the end of the course, the student should be able to:
  1. Explain the normal functioning of all structures of the eye and their interactions.
  2. Elucidate the physiological aspects of normal growth and development of the eye.
  3. Understand the phenomenon of vision
  4. List the physiological principles underlying pathogenesis and treatment of diseases of the eye.
- **Text Book**:
  A. K. Khurana, Indu Khurana: Anatomy and Physiology of Eye, 2nd edition, CBS Publishers, New Delhi, 2006.
- **Reference Books:**
  1. R. D. Ravindran: Physiology of the eye, Arvind eye hospitals, Pondicherry, 2001.
  2. P. L. Kaufman, A. Alm: Adler's Physiology of the eye clinical application, 10th edition, Mosby, 2002.

- **Course Plan:**
  1. Protective mechanisms in the eye: Eye lids and lacrimation, description of the globe
  2. Extrinsic eye muscles, their actions and control of their movements
  3. Coats of the eye ball
  4. Cornea
  5. Aqueous humor and vitreous: Intra ocular pressure
  6. Iris and pupil
  7. Crystalline lens and accommodation – presbyopia
  8. Retina – structure and functions
  9. Vision – general aspects of sensation
  10. Pigments of the eye and photochemistry
  11. The visual stimulus, refractive errors\
  12. Visual acuity, Vernier acuity and principle of measurement
  13. Visual perception – Binocular vision, stereoscopic vision, optical illusions
  14. Visual pathway, central and cerebral connections
  15. Colour vision and colour defects. Theories and diagnostic tests
  16. Introduction to electro physiology
  17. Scotopic and Photopic vision
  18. Color vision, Color mixing
  19. Mechanism of accommodation
  20. Retinal sensitivity and Visibility
  21. Receptive stimulation and flicker
  22. Ocular, movements and saccades
  23. Visual perception and adaptation
  24. Introduction to visual psychology (Psychophysics)

- **Practical:**
  1. Lid movements
  2. Tests for lacrimation tests
  3. Extra ocular movements
  4. Break up time
  5. Pupillary reflexes
  6. Applanation tonometry
  7. Schiotz tonometry.
  8. Measurement of accommodation and convergence
  9. Visual acuity measurement.
  10. Direct ophthalmoscopy
  11. Indirect ophthalmoscopy
  12. Retinoscopy
  13. Light and dark adaptation.
  14. Binocular vision (Stereopsis)

BOPT 202 : BASIC BIOCHEMISTRY & BASIC PHARMACOLOGY
BASIC AND OCULAR BIOCHEMISTRY

BASIC BIOCHEMISTRY

- **Course Description**:
  This course will be taught in two consecutive semesters. General Biochemistry deals with the biochemical nature of carbohydrates, proteins, minerals, vitamins, lipids etc. A detailed study of these, emphasizing on their chemical composition and their role in metabolism is the required aim of this course.

- **Course Objectives**:
  At the end of the course, the student should be able to: demonstrate his knowledge and understanding on:
  1. Structure, function and interrelationship of biomolecules and consequences of deviation from normal.
  2. Integration of the various aspects of metabolism and their regulatory pathways.
  3. Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data.

- **Text Book**:
  S. Ramakrishnan: Essentials of biochemistry and ocular biochemistry, Annamalai University Publications, Chidambaram, India, 1992.

- **Reference Books:**
  1. S. Ramakrishnan, K. G. Prasannan and R. Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990.
  2. D. R. Whikehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003.

- **Course Plan:**
  1. Carbohydrates:
     Glucose; fructose; galactose; lactose; sucrose; starch and glycogen (properties and tests, Structure and function)
  2. Proteins:
     Amino acids, peptides and proteins (general properties & tests with a few examples like glycine, trytophan, glutathione, albumin, hemoglobin, collagen)

3. Lipids:
   Fatty acids, saturated and unsaturated, cholesterol and triacyglycerol, phospholipids and plasma membrane
4. Vitamins:
   General with emphasis on A, B2, C, E and inositol (requirements, assimilation and properties)
5. Minerals:
   Na, K, Ca, P, Fe, Cu and Se. (requirements, availability and properties)

- **Practical**
  1. Reactions of monosaccharides, disaccharides and starch:

Glucose	Fructose
Galactose	Maltose, lactose
Sucrose	Starch

  2. Analysis of Unknown Sugars
     Estimation**:**

Photometry	Biofluid of choice – blood, plasma, serum
Standard graphs	Glucose
Proteins	Urea
Creatinine	Bilirubin

OCULAR BIOCHEMISTRY

- **Course Description**:
  This course is being taught in two consecutive semesters. Ocular Biochemistry deals with the metabolism that takes place in the human body. It also deals with ocular biochemistry in detail. Clinical estimation as well as the clinical significance of biochemical values is also taught.

- **Course Objectives**:
  At the end of the course, the student should be able to demonstrate his knowledge and understanding on
  1. Structure, function and interrelationship of biomolecules and consequences of deviation from the normal.
  2. Integration of various aspects of metabolism and their regulatory pathways
  3. Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data
  4. Understand metabolic processes taking place in different ocular structures.

- **Text Book**:
  S. Ramakrishnan: Essentials of biochemistry and ocular biochemistry, Annamalai University Publications, Chidambaram, India, 1992

- **Reference Books**:
  1. S. Ramakrishnan, K. G. Prasannan and R. Rajan: Text book of Medical Biochemistry, Orient Longman, Madras, 1990
  2. D. R. Whikehart: Biochemistry of the Eye, 2nd edition, Butterworth Heinemann, Pennsylvania, 2003

- **Course Plan**
  1. Hormones basic concepts in metabolic regulation with examples say insulin.
  2. Metabolism: General whole body metabolism (carbohydrates, proteins, lipids)
  3. 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.
  4. Technique: 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.
  5. Clinical Biochemistry: Blood sugar, urea, creatinine and bilirubin significance of their estimation.

- **Practical**
  1. Quantitative analysis
  2. Abnormal constituents in urine, sugar proteins, ketones, blood and bile salts.
  3. Techniques of detection of abnormal constituents of urine:
  4. Electrophoresis
     4.1. Chromatography
     4.2. Preparation of normal, molar and percentage solutions.
     4.3. Preparation of buffers, pH determination
  5. Demonstration
     5.1. Estimation of blood cholesterol
     5.2. Estimation of alkaline phosphatase.
     5.3. Salivary amylase (effect of ph, etc)
     5.4. Milk analysis.

BASIC AND OCULAR PHARMACOLOGY

- **Course Description:**
  This course covers the actions, uses, adverse effects and mode of administration of drugs, especially related to eyes.

- **Course Objectives:**
  At the end of the course the students will acquire knowledge in the following aspects-
  1. Basic principle of pharmacokinetics & Pharmacodynamics
  2. Commonly used ocular drugs, mechanism, indications, contraindications, drug dosage and adverse effects.

- **Text Book/Reference Books:**
  1. K. D. Tripathi: Essentials of Medical Pharmacology. 5th edition, Jaypee, New Delhi, 2004
  2. Ashok Garg: Manual of Ocular Therapeutics, Jaypee, New Delhi, 1996
  3. T. J. Zimmerman, K. S. Kooner : Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

- **Course Plan**
  1. General Pharmacology: Introduction & sources of drugs, Routes of drug administration, Pharmacokinetics (emphasis on ocular pharmacokinetics), Pharmacodynamics & factors modifying drug actions.
  2. Systemic Pharmacology: Autonomic nervous system: Drugs affecting papillary size and light reflex, Intraocular tension, Accommodation; Cardiovascular system: Anti hypertensive sand drugs useful in Angina; Diuretics: Drugs used in ocular disorders; Central Nervous System: Alcohol, sedative hypnotics, General & local anaesthetics, Opioids & non-opioids; Chemotherapy : Introduction on general chemotherapy, Specific chemotherapy –Antiviral, antifungal, antibiotics; Hormones : Corticosteroids, Antidiabetics; Blood Coagulants.
  3. Ocular Pharmacology: Ocular preparations, formulations and requirements of an ideal agent; Ocular Pharmacokinetics, methods of drug administration & Special drug delivery system; Ocular Toxicology.
  4. Diagnostic & Therapeutic applications of drugs used in Ophthalmology: Diagnostic Drugs & biological agents used in ocular surgery, Anaesthetics used in ophthalmic procedures, Anti-glaucoma drugs; Pharmacotherapy of ocular infections –Bacterial, viral, fungal & chlamydial; Drugs used in allergic, inflammatory& degenerative conditions of the eye; Immune modulators in Ophthalmic practice, Wetting agents & tear substitutes, Antioxidants.

BOPT 203 : BASIC MICROBIOLOGY & BASIC PATHOLOGY

BASIC MICROBIOLOGY

- **Course Objectives**:
  1. To study the characteristics of bacteria viruses, fungi and parasites causing diseases of eye
  2. To apply the principles of sterilization and dis-infection in hospital and ophthalmic practice
  3. To understand the pathogenesis of the diseases caused by the above listed organisms in the human body in special reference to the eye infection.
  4. To apply principles of diagnostic ocular microbiology

- **Course Outcome:**
  The student will be able to should demonstrate fundamental knowledge and insight into general microbiology and immunology.

- **Text Reference Books:**
  1. Ocular Microbiology
  2. Microbiology for the Health Sciences 3rd edition: Burton G. R. W. St. Louis J. P. Lippincott Co., 1988
  3. Medical Microbiology- An Introduction to Infectious Diseases, John C. Shennis
  4. Practical Medical Microbiology and Cytology of Eye- Kathleen Byrle, Eileen Bund, Khalid Tabbara, Robert Hyndiuk, Butterworth Heinemann
  5. Parson's Diseases of the eye- Stephen J. H. Miller

- **Course Plan:**
  1. Morphology of bacteria and cultivation of bacteria
  2. Sterilization and Disinfection
  3. General properties of viruses and laboratory diagnosis of fungal infections
  4. Introduction to parasitology and laboratory diagnosis of parasitic infections
  5. Diagnosis procedures in ocular microbiology
  6. Conjunctival infections (Bacterial –I)

7. II (Viral) Conjunctival infections
8. III (Fungal and parasitic)
9. Corneal infection (Bacterial)- I
10. Corneal infectious (Viral, fungal)-II
11. Infections of Sclera
12. Infections of Uveal tract- I (Bacterial)
13. Infections of Uveal tract-II (fungal, viral and parasitic)
14. Infections of retina
15. Infections of lachrymal gland orbit and eyelid-I
16. Infections of lachrymal gland- Orbit and eye lid-II
17. Hospital acquired infections

- **List of Practicals**
  1. Grams, staining
  2. ZN stain and modification of ZN stain
  3. Fungal stains (Kott mount) (Lactopheral Cotton blue mount)
  4. Sterilization
  5. Demonstration of Culture media

BASIC PATHOLOGY

- **Objectives:**
  At the end of the course students will acquire knowledge in the following aspects:
  1. Inflammation and repair aspects.
  2. Pathology of various eye parts and adnexa.

- **Text Book:**
  K. S. Ratnagar: Pathology of the eye & orbit, Jaypee brothers Medical Publishers, 1997

- **Reference Books:**
  1. CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th edition, Elsevier, New Delhi, 2004.
  2. S. R. Lakhani Susan A. D. & Caroline J. F.: Basic Pathology: An introduction to the mechanism of disease, 1993.

- **Course Plan:**
  1. Inflammation and repair
  2. Infection in general
  3. Specific infections
     3.1. Tuberculosis
     3.2. Leprosy
     3.3. Syphilis
     3.4. Fungal infection
     3.5. Viral chlamydial infection
  4. Neoplasia
  5. Haematology
     5.1. Anemia
     5.2. Leukemia
     5.3. Bleeding disorders
  6. Circulatory disturbances
     6.1. Thrombosis
     6.2. Infarction
     6.3. Embolism
  7. Clinical pathology
     7.1. Interpretation of urine report
     7.2. Interpretation of blood smears.
  8. Immune system
  9. Shock, Anaphylaxis
  10. Allergy

BOPT 204 : OPHTHALMIC OPTICS

- **Course Objective:**
  The Optometry students should learn the current lenses manufacturing and latest trend of glasses and various verities available in the industry and market. This course is mainly emphasized on the optics of lenses and properties along with the various uses of glasses for the correction of the error and in ophthalmic instruments.

- **Course Outcome:**
  The student will be able to acquire the knowledge of Ophthalmic lens, its measurements and dispensing

- **Text And Reference Books:**
  1. Dispensing Optics – M. Jeilly
  2. Dispensing Optics – Borish

- **Course Plan**
  1. Introduction- Vergence and vergence techniques revised. Lens power and cylindrical lenses
  2. Gullstrand's schematic eyes, visual acuity, stile Crawford experiment and Binocular telescopes
  3. Emmetropia and Ametropia
  4. Correction of spherical Ametropia
  5. Thin lens model of the eye-angular magnification-magnification of microscope, telescope. Spectacle and relative spectacle magnification. Aperture stops-entrance and exit pupils.
  6. Applications-To calculate the angular magnification, dioptric power of spectacles, spectacle magnification, entrance and exit pupils, vertex distances.
  7. Presbyopia
  8. Aphakia
  9. Astigmatism-Applications- For e.g. to calculate the dioptric power, angular magnification of spectacles in aphakic, presbyopic patients. To calculate the position of line image in a sphero-cylindrical lens.
  10. Holography
  11. Spatial distribution of optical information- modulation transfer functions-spatial filtering-applications

- **Practical:**
  1. Construction of a tabletop telescope – all three types of telescopes.
  2. Construction of a tabletop microscope
  3. Imaging by a cylindrical lens – relationship between cylinder axis and image orientation
  4. Imaging by two cylinders in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinders' powers and orientations
  5. Imaging by a sphero cylindrical lens – sphere and cylinder in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinder's power and orientation

BOPT 205: COMPUTERS FOR OPTOMETRY

- **Course Description**:
  The course has focus on computer organization, computer operating system and software and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

- **Course Objectives**:
  The students will be able to appreciate the role of computer technology and some extent able to gain hand-on experience in using computers.

- **Course Plan**:
  Students will be given hand-on practical sessions and reading materials (softcopy). Some of the topics will be demonstration.

  1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
  2. 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 responsesystems).
  3. Processor and memory: The Central Processing Unit (CPU), main memory.
  4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
  5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
  6. Introduction to MS-Word: 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.
  7. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
  8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

9. Introduction of Operating System: introduction, operating system concepts, types of operating system.
10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
11. 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.
12. Application of Computers in clinical settings.