DPU

Dr. D. Y. PATIL VIDYAPEETH, PUNE

(Deemed to be University)

Revised Syllabus of Second Year of

Bachelor of Clinical Optometry (B. Optom.) Programme

Academic Year 2023-24 & 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/ 325·B /23
Date : 21·04·2023

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 – 2014-15" which was revised upto April 2019.** This syllabus is hereby repealed for the students admitted to the **Second Year of Bachelor of Clinical Optometry (B. Optom.) Programme** from **Academic Year 2023-2024 and onwards (for batch admitted to the first year in Academic Year 2022-23),** however, the same will be **continued for the repeater students**, till the last student clears his/her Second Year of the Programme.

Further, for the **students in the Third and Fourth 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 Third and subsequent Years of the Programme.

And whereas in pursuance of the resolution passed by the **Academic Council** at its meeting held on **15th March, 2023** vide **Resolution No. AC- AC-09 (vii)-23** regarding the **revision in the syllabus of Second 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 **28th March, 2023 vide Resolution No. BM-05-(iv)-23** regarding the **revision in the syllabus of Second Year of Bachelor of Clinical Optometry (B. Optom.) Programme as per Ministry of Health and Family Welfare Model Curriculum Handbook-Optometry** for implementation.

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The **Revised Syllabus of Second Year (Semester – III & Semester – IV) of Bachelor of Clinical Optometry (B. Optom.) Programme** as per Ministry of Health and Family Welfare Model Curriculum Handbook-Optometry consist for following courses:

Semester - III		**Semester – IV**	
BOPT 301	Visual Optics-I & Optometric Instruments	BOPT 401	Visual Optics-II
BOPT 302	Dispensing Optics-II	BOPT 402	Optometric Investigation
BOPT 303	Ocular Disease-I & Clinical Examination of Eye	BOPT 403	Optometric Optics
BOPT 304	Indian Medicine & Telemedicine	BOPT 404	Low Vision Aids
BOPT 305	Clinical Optometry - I	BOPT 405	Ocular Diseases-II
		#BOPT 406	Environmental Sciences

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

(Dr. A. N. Suryakar)
Registrar

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

(Dr. A. N. Suryakar)
Registrar
Dr. D. Y. Patil Vidyapeeth
(Deemed to be University)
Pimpri, Pune- 18.

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 an application form, a certificate of Medical fitness from a registered medical practitioner.

5. Admission to Bachelor of Clinical Optometry programme 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 Vidyapeeth 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 programme (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 programme 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 Examination 50 Marks
2. Internal Assessment Examination 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) = $\Sigma(Ci \times Gi) / \Sigma Ci$
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 = $\Sigma(Ci \times Si) / \Sigma Ci$
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 = 15
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 statement of marks 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. programme, a student must pass the University examinations of 1st & 2nd semesters of first year B. Optom. programme and a student from second year B. Optom. programme 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 programme, a student must pass all three academic years of B. Optom. programme.

(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 Vidyapeeth 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 Vidyapeeth. The teacher/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

PROGRAMME 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 programme 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 Programme 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 Programme in collaboration with all Heads of the Departments. The Incharge, Internship Training Programme, 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 programme 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 programme.

The programme 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 Indian Optometric Association (I.O.A.), Association of Schools & Colleges of Optometry (A.S.C.O.) and accepted by the Vidyapeeth. 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 Vidyapeeth for the award of Bachelor of Clinical Optometry Degree.

OBJECTIVES –

At the end of Internship programme, 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 programme 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 Programme, the Principal and Internship programme Staff incharge shall conduct one day Orientation programme to orient the internees to get acquainted with the details of Internship Training Programme. The Orientation programme 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 programme. 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)	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 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)	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 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

SEMESTER III

BACHELOR OF CLINICAL OPTOMETRY

3rd SEMESTER

BOPT 301: VISUAL OPTICS-I & OPTOMETRIC INSTRUMENTS

VISUAL OPTICS-I

A sound knowledge of theory in Visual Optics is a pre- requisite for practical training in clinical refraction and related area. The objective of this course is to prepare the candidate through didactic lectures, which student is expected to translate into practice at the clinics**.**

1. **COURSE OBJECTIVE**:
   Upon completion of the course, the student should be able:
   1. To understand the fundamentals of optical components of the eye
   2. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction

2. **COURSE OUTCOME**:
   a) To be able to implement the knowledge of the optics of various ocular structures
   b) To be able to diagnose and detect different types of refractive errors
   c) To be able to perform retinoscopy

3. **TEXT AND REFERENCE BOOKS**
   a) A H Tunnacliffe: Visual optics, The Association of British Optician, 1987
   b) AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998
   c) M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
   d) HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
   e) H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.
   f) WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA,2006 5. T Grosvenor: Primary Care Optometry,4th edition, Butterworth –heinneman, USA, 2002

g) Clinical Optics - Troy Fanin

h) Optics and Refraction- L. P. Aggarwal

i) Principles of Optics and Refraction- Duke Elder

j) Visual Optics and Refraction – A clinical approach Dravid D. Michael's: The C.V. Mosby and Co. 1985

COURSE PLAN:

A) REVIEW OF GEOMETRIC OPTICS

a) Vergence and Power

b) Sign Convention

c) Spherical refracting surface

d) Spherical mirror; Catoptrics power

e) Cardinal points

f) Magnification

B) OPTICS OF OCULAR STRUCTURES

a) Cornea and aqueous

b) Crystalline lens

c) Vitreous

d) Schematic and reduced eye

C) REFRACTIVE CONDITIONS OF EYE

a) Emmetropia

b) Myopia

c) Hypermetropia

d) Astigmatism

e) Presbyopia

D) REFRACTIVE ANOMALIES AND THEIR CAUSES

a) Aetiology of refractive anomalies

b) Contributing variability's and their ranges

c) Populating distributions of anomalies

d) Optical component measurements

e) Growth of the eye in relation to refractive errors

E) ACCOMMODATION AND CONVERGENCE

a) Far and Near point of accommodation, range of accommodation, amplitude

b) Methods of measurement of Accommodation

c) Neat point of convergence- significance

d) Methods of measurement of Convergence

e) Accommodation Convergence/ Accommodation ratio

F) RETINOSCOPY- PRINCIPLES AND METHODS

a) Retinoscopy- speed of reflex and optimum condition

b) Retinoscopy- design consideration

c) Review of objective refractive methods

d) Review of subjective refractive methods

e) Cross cylinder method for astigmatism

f) Difficulties in subjective tests and their avoidance

g) Transposition of lenses

h) Spherical equivalent

OPTOMETRIC INSTRUMENTS

1. COURSE OBJECTIVE-

- This course gives an in depth knowledge about the construction and working of various instruments used in the Optometric practice.
- Upon completion of the course, the student should be able to gain theoretical knowledge and basic practical skill in handling the following instruments

1. Visual Acuity chart / Snellen's drum
2. Retinoscope
3. Trail Box
4. Jackson Cross cylinder
5. Direct ophthalmoscope
6. Slit lamp Biomicroscope
7. Slit lamp Ophthalmoscopy (+90 D, +78 D)
8. Gonioscope

9. Tonometer: Applanation Tonometer
10. Keratometer
11. Perimeter
12. Electrodiagnostic instrument (ERG, VEP, EOG)
13. A –Scan Ultrasound
14. Lensometer

2. COURSE OUTCOME:

Student should be able to use the instruments to an optimum level in diagnosis & management of the ocular disorders and help them in maintenance of these instruments

3. TEXT AND REFERENCE BOOKS

1. Optometric Instrumentation. Santosh K. Kumar
2. Optometric Instrumentation- Dravid B. Henson
3. Clinical Visual Optics- Bennet and Rabbeetts
4. Visual Optics and Refraction- David O. Michales
5. Primary Care Optometry-Theoder Grosvenor
6. Practical Orthoptics in treatment of squint- T. Keith Lyle and Sylvia Jackson

COURSE PLAN:

1) REFRACTIVE INSTRUMENTS

a) Test chart standards
b) Choice of test charts
c) Trial case lenses- best forms
d) Refractor (phoropter) head units
e) Trial frame design
f) Near vision difficulties with units and trial frame
g) Optical considerations of refractor units

2) OPHTHALMOSCOPES

a) Direct Ophthalmoscope-design, uses
b) Indirect Ophthalmoscope-design, uses
c) Filters for Ophthalmoscopy

3) SLIT LAMP

a) Parts of Slit lamps

b) Slit lamps accessories

4) TONOMETER

a) Tonometer principles

b) Types of tonometers and standardization

c) Use and interpretation of tonometers

5) Fundus Camera-Principles and technique

6) External eye photography-apparatus and techniques

7) Corneal examination

a) Placidos disc

b) Keratometer

c) Video Keratoscopy

d) Corneal Topography

e) Specular Microscope

f) Aesthesiometer

8) Exopthalmometer

9) Auto-Refractionometer

10) Potential acuity meter

11) A scan

12) Pupilometer

13) aberrometer

BOPT 302: DISPENSING OPTICS-II

1) COURSE OBJECTIVE-

This course deals mainly with the prescription of lenses, prisms and frames. Which form the backbone of optometric practice, prepares the students to work competently and confidently in the clinical environment. Imparting knowledge about surfacing and polishing, spherical, sphero cylindrical and bifocal spectacle lenses.

COURSE OUTCOME:

- Students should be able to cut finished lenses according to various frame shapes and sizes and fit them into frames after glazing.
- Should be able to assess facial and frame shape and sizes and evaluate all parameters, which are essential for an ideal spectacle fit.
- To be able to check any defects in a finished lens before dispensing the lenses to a patient.

2) TEXT AND REFERENCE BOOKS-

a) Principles of Ophthalmic Lenses: M JALIE

b) System for Ophthalmic Dispensing: Clifford W Brooks & Irvin M. Borish

c) Practical aspects of ophthalmic Optics: Margaret Dowaliby

d) The fine art of prescribing glasses without making a spectacle of yourself Benjamin Milder and Melvin L. Rubin

COURSE PLAN:

Ophthalmic Lenses Types, Manufacturing, Workshop Practice

1) Recording and ordering of ophthalmic lenses
2) Terminology used in Lens workshops
3) Ophthalmic raw materials- history and general outline
4) ISI Standards for lenses
5) Manufacturing of Ophthalmic blanks- Plastic
6) Plastic lenses- material types and characteristics
7) Plastic Lens- manufacture
8) Ophthalmic lens designs-best form lenses
9) Design of high- powered lenses

10) Bifocal design and manufacture

11) Faults in lenses- description

12) Faults in lenses- detection

TYPES OF OPHTHALMIC LENSES

1) Aspheric lenses
2) High index lenses
3) Bifocal and multifocal lenses-types and characteristics
4) Bifocal and multifocal lenses-purposes and choice
5) Photo chromatic lenses
6) Polaroid lenses
7) Tinted lenses- absorptive properties
8) Tinted lenses- examples and discussions
9) Special purpose lenses

SPECTACLE FRAMES- THEORY BASICS (I)

1) History of spectacles
2) Nomenclature and terminology
3) Classification of frames- Temple position, coloration
4) Types of frame materials- advantages and disadvantages
5) Frame materials- Gold
6) Frame materials- basic metal
7) Frame materials- Plastics
8) Manufacturing of spectacle frames- overview
9) Face and frame measurement
10) Dyes and colorants- lenses and frame

SPECTACLE MANUFACTURING-OPTICIAN SHOP (II)

1) Dispensing counter organization
2) Types of spectacle frames available
3) Types of human faces
4) Face and frame measurements

5) Choice of frames
6) Cosmetic dispensing-different types of faces, colors, etc
7) Functional dispensing-various professions and age groups
8) Special purpose frames and accessories
9) Testing of frames- general
10) Testing of frames- special
11) Recording and ordering of frames and appropriate lenses
12) Measurements for ordering spectacles- IPD, marking center, vertex distance calculations
13) Special measurements for fitting special lenses- Bifocals, multifocal, prism lenses, etc
14) Fitting of lenses in various types of frames
15) Glazing and Edging processes
16) Glazing of bifocals, high powered, other special lenses
17) Faults in lenses- description and detection
18) Final checking, adjustments to prescription spectacles
19) Final dispensing of spectacles to customer
20) Patient complaints, handling and correction
21) Repairs of spectacles- Soldering, rivets for metal, plastic frames
22) Special types of spectacles and appliances
23) Monocells and ptosis crutches

BOPT 303: OCULAR DISEASE-I & CLINICAL EXAMINATION OF EYE

Ocular Disease-I

1. COURSE OBJECTIVE:

This course is designed to provide the Optometrist with a Comprehensive yet concise Curriculum of the field of Ophthalmology with reference to ocular diseases. The course reviews basic background knowledge as well as focuses on specific areas of key interest to the Optometrist. Special attention will be paid to the methods of examination in various sub- specialties of Ophthalmology.

COURSE OUTCOME:

- Student should be able to diagnose various ocular diseases
- Should be able to perform various tests leading to the proper detection & management of the disease

2. TEXT AND REFERENCE BOOKS

a. Basic and Clinical Science Course, American Academy of Ophthalmology (AAO), 1992-93/ 1993-94

b. Parsons Diseases of the eye, Stephen J. H. Miller, 17th Edition 1984, Churchill Livingstone.

c. Clinical Ophthalmology, Jack J Kanski, 2nd Edition, 1989, Butterworth's.

d. The Ocular Disease Manual- Mayler Robertson.

COURSE PLAN:

1. EYELIDS

a) Eyelid anatomy

b) Congenital and developmental anomalies of the eyelids

c) Blespharospasm

d) Ectropion

e) Entropion

f) Trichiasis and symblepharon

g) Eyelid and inflammations

h) Eyelid tumors

i) Ptosis

j) Eyelid retraction Eyelid trauma

2. LACHRYMAL SYSTEM

a) Lachrymal gland anatomy

b) Lachrymal pump

c) Congenital and developmental anomalies of the lachrymal system

d) Lachrymal obstruction

e) Lachrymal sac tumors

f) Lachrymal trauma

3. SCLERA

a. Ectasia and staphyloma

b. Scleritis, episcleritis

4. ORBIT

a) Orbital anatomy

b) Incidence of orbital abnormalities

c) Methods of orbital examination

d) Congenital and developmental anomalies of the orbit

e) Orbital tumors

f) Orbital inflammations

g) Sinus disorders affecting the orbit

h) Orbital trauma

5. CONJUNCTIVA AND CORNEA

a) Inflammations

b) Tumors

1. Tumors of epithelial origin
2. Glandular and adnexal tumours
3. Tumors of neuro-ectodermal origin
4. Vascular tumours
5. Xanthomatous lesions
6. Inflammatory lesions
7. Metastasis lesion

c) Degenerations and dystrophies

d) Miscellaneous conditions
   1) Kerato-Conjuctivitis Sicca
   2) Stevens- Johnson Syndrome
   3) Ocular Rosacea
   4) Atopic eye disorders
   5) Benign muscosal pemphigoid- ocular pemphigold
   6) Vitamin A Deficiency
   7) Metabolic diseases associated with corneal changes

6. IRIS, CILIARY BODY AND PUPIL

a) Congenital anomalies
b) Primary and secondary disease of iris and ciliary body
c) Tumors
d) Anomalies of pupillary reactions

7. CHOROID

a) Congenital anomalies of the choroid
b) Diseases of the choroid
c) Tumors

Clinical Examination of Eye

COURSE OBJECTIVE:
This course is to acquaint the students regarding basic history taking and basic examination technique of a patient attending the OutPatient Department with ophthalmic complaints.

COURSE OUTCOME:
Student should be able to perform certain diagnosis tests like visual fields, macular function test, etc to confirm the clinical findings and help aid in diagnosis.

TEXT REFERENCE BOOKS

a) External Eye Diseases- A Color Atlas- Mark T Watts Butterworth Heinemann
b) Clinical Procedures for ocular examination- Carlson
c) External Eye Diseases a systematic approach – Ian Mackie, Butterworth Heinemann

d) Clinical Examination of Ophthalmic cases- M. L. Aggarwal and L.C. Gupta
e) Clinical optometry, Jack K. Kansi, Butterworth 2nd Ed, 1989
f) Basic and Clinical Sciences- American Optometric Association
g) Clinical Procedures in primary eye care- David Elliott
h) Diagnosis of defective color vision- Jennie Birch, Butterworth Heinemann.

COURSE PLAN:

1. History of the ophthalmic subject
2. Visual acuity testing- distance and near and color vision
3. Pupil examination
4. Orthoptic examination
   - Extraocular motility, cover test, alternating cover test
   - Prism bar
   - Hirschberg test, Modified krimsky
   - MaddoxRod
   - Stereopsis
   - Saccades & pursuit test
5. Slit lamp examination and Technique
   - VanHerrick technique
   - External examination of the eye, lids Eversion
6. Examination of intra-ocular pressure and angle of anterior chamber
7. Ophthalmoscopy- Direct and indirect
8. Tear film examination
   - Schimers, TBUT, tear meniscus level, NIBUT (keratometer)
9. Examination of lachrymal system
   - ROPLAS
   - Syringing
10. Examination of orbit
11. Macular function test
    - Photostress test
    - Amsler test
    - Contrast sensitivity function test
12. Visual field charting/testing (Central) (Peripheral) Confrontation test
13. Neuro - Ophthalmologic examination

BOPT 304: INDIAN MEDICINE & TELEMEDICINE

COURSE OBJECTIVE:
Knowledge of the health care delivery system in India & epidemiology of communicable & non-communicable diseases. The student also will get basic knowledge about the telemedicine practices in India especially in eye care.

COURSE OUTCOME:
At the end of the course student will be aware of the traditional and the latest healthcare system.

TEXT BOOK:
Margie Lovett Scott, Faith Prather. Global health systems comparing strategies for delivering health services. Joney & Bartlett learning, 2014 (page 167 -178)

REFERENCE BOOKS:
Faculty may decide

COURSE PLAN:
Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system
   1.1 Healthcare delivery system in India at primary, secondary and tertiary care
   1.2 Community participation in healthcare delivery system
   1.3 Health system in developed countries.
   1.4 Private Sector
   1.5 National Health Mission
   1.6 National Health Policy
   1.7 Issues in Health Care Delivery System in India
2. National Health Programme-Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.
3. Introduction to AYUSH system of medicine
   3.1 Introduction to Ayurveda.
   3.2 Yoga and Naturopathy
   3.3 Unani

3.4 Siddha

3.5 Homeopathy

3.6 Need for integration of various system of medicine

4. Health scenario of India- past, present and future

5. Demography & Vital Statistics-
   5.1 Demography – its concept

   5.2 Vital events of life & its impact on demography

   5.3 Significance and recording of vital statistics

   5.4 Census & its impact on health policy

6. Epidemiology

   6.1 Principles of Epidemiology

   6.2 Natural History of disease

   6.3 Methods of Epidemiological studies

   6.4 Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance

BOPT 305: CLINICAL OPTOMETRY – I

COURSE OBJECTIVE:
Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a registered optometrist. The practical aspects of the dispensing optics (hand-on in optical), optometric instruments, clinical examination of visual system (Hands-on under supervision) and ocular diseases (Slides and case discussion) will be given to the students during their clinical training

COURSE OUTCOME:

- Should be able to perform various tests leading to the proper detection & management of the disease
- Should be able to dispense spectacles based on patient need

SEMESTER IV

BOPT 401: VISUAL OPTICS-II

COURSE OBJECTIVE:
This course deals with the concept of eye as an optical instrument and thereby covers different optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.

COURSE OUTCOME:
Upon completion of the course, the student should be able:
1. To understand and implement the knowledge of optical components of the eye
2. To be able to perform visual acuity measurement, objective and subjective clinical refraction.

TEXT BOOK/REFERENCE BOOKS:

1. Theodore Grosvenor: Primary Care Optometry, 5th edition, Butterworth – Heinemann, 2007
2. Duke –Elder's practice of Refraction
3. AI Lens: Optics, Retinoscopy, and Refractometry: 2nd edition, SLACK Incorporated (p) Ltd, 2006
4. George K. Hans, Kenneth Cuiffreda: Models of the visual system, Kluwer Academic, NY, 2002
5. Leonard Werner, Leonard J. Press: Clinical Pearls in Refractive Care, Butterworth –Heinemann, 2002
6. David B. Elliot: Clinical Procedures in Primary Eye care, 3rd edition, Butterworth –Heinemann, 2007
7. WJ Benjamin: Borish's clinical refraction, 2nd edition, Butterworth Heinemann, Missouri, USA,2006

COURSE PLAN:
1. **Accommodation & Presbyopia**
   - Far and near point of accommodation
   - Range and amplitude of accommodation
   - Mechanism of accommodation
   - Variation of accommodation with age
   - Anomalies of accommodation
   - Presbyopia
   - Hypermetropia and accommodation

2. **Convergence:**
   - Type, Measurement and Anomalies
   - Relationship between accommodation and convergence-AC/A ratio

3. **Objective Refraction (Static & Dynamic)**
   - Streak retinoscopy
   - Principle, Procedure, Difficulties and interpretation of findings
   - Transposition and spherical equivalent
   - Dynamic retinoscopy various methods
   - Radical retinoscopy and near retinoscopy
   - Cycloplegic refraction

4. **Subjective Refraction:**
   - Principle and fogging
   - Fixed astigmatic dial (Clock dial), Combination of fixed and rotator dial (Fan and block test), J.C.C
   - Duochrome test
   - Binocular balancing- alternate occlusion, prism dissociation, dissociate Duochrome balance, Borish dissociated fogging
   - Binocular refraction-Various techniques

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

BOPT 402: OPTOMETRIC INVESTIGATION

COURSE OBJECTIVE:

This course is designed to provide Optometrist with a comprehensive and concise understanding of all ophthalmic investigations. The Course reviews basic background knowledge as well as focuses on specific areas of key interest to the Optometrist. Special attention will be paid to the methods of examination and instruments expected to be used by an Optometrist in an ophthalmic hospital as well as in an optical establishment.

COURSE OUTCOME:

- The student will demonstrate the knowledge and skills and be able to discuss and undertake the examinations of patients using different investigative or diagnostic techniques.
- Students will use instruments in ocular examinations and will understand the implication of the findings in terms of subsequent examination techniques

1. TEXT AND REFERENCE BOOKS

a) Clinical procedures in Primary Eye Care- David Elliot, Butterworth Heinemann

b) Basic and Clinical Science Course, American Academy of Opthalomology

c) Clinical Ophthalmology Jack K. Kanski, 2nd ed, 1989, Butterworths

COURSE PLAN:

1. Visual Acuity Testing and Theory
2. Color Vision Testing and Theory
3. Electro Retino - graphy. ERG
4. Electro Oculo - graphy, EOG
5. Electro Myo - graphy EMG
6. Electro Nystagmo - graphy
7. Flourscein Angiography
8. Ultrasonography
9. Visual Evoked Response / Potential V.E.R or V.E.P
10. Tonometer, Tonometry and Tonography
11. Visual Field Charting and Perimetry
12. Adaptation and Adaptometry

13. Berman's Locator
14. Cryo Technique
15. Diathermy
16. Photo-coagulation
17. Methods of examination (Focal illumination)
18. Slit lamp and Attachments
19. Gonioscopy
20. Pachymetry
21. Ocular Photography (Ant. Seg)
22. Contact and Trans illumination
23. PH Testing and Schemer's Test
24. Fluorescence in Staining and Techniques
25. Syringing and Lachrymal Techniques
26. Ophthalomoscopy
27. Retinoscopy
28. Auto- Refraction
29. Keratometry
30. Ophthalmic Lens Measuring Instrument

BOPT 403: OPTOMETRIC OPTICS

COURSE OBJECTIVE:
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. Knowledge on different types of lenses based on their requirement

COURSE OUTCOME:
at the end of this course:
1. Students should be able to advise on different types of Tinted, Protective & Special lenses
2. Students should be able to dispence Special types of spectacle frames
3. Should be able to prescribe Different types of prism & lenses

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, IM Borish: System for Ophthalmic Dispensing, 3rd edition, Butterworth - Heinemann, 2007
4. Michael P Keating: Geometric, Physical & Visual Optics, 2nd edition, Butterworth –Heinemann, 2002

COURSE PLAN:
Tinted & Protective Lenses
- Characteristics of tinted lenses Absorptive Glasses
- Polarizing Filters, Photochromic & Reflecting filters
- Safety lenses-Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses

Miscellaneous Spectacle:
- Iseikonic lenses
- Spectacle magnifiers
- Recumbent prisms spectacle
- Fresnel prism and lenses
- Lenticular &Aspherical lenses
- High Refractive index glasses

Special types of spectacle frames
- Monocles
- Ptosis crutches
- Industrial safety glasses
- Welding glasses & sheilds

BOPT 404: LOW VISION AIDS

1. COURSE OBJECTIVE:

Patient both young and old, who suffers from irreversible and incurable conditions which cannot be managed by conventional therapy, can be helped to perform their tasks with Low Vision Aids.

COURSE OUTCOME:

The student will demonstrate knowledge, understanding and skills, and be able to discuss and manage patients whose vision cannot be improved significantly using conventional spectacles or contact lenses, in order to make the most of their residual vision using magnifying systems and imaging technology

2. TEXTBOOK AND REFERENCE BOOKS:

a) Low Vision Care - Edwin B. Mehr and Allan N. Freid The professional press, Chicago 1975

b) Optometric Management of visual Handicap - Helen Farrall, Blackwell scientific Publications, London 1991

c) Art and practice of low vision-Paul freeman, Butterworth Heinemann

COURSE PLAN:

1. Identifying the low vision patient
2. History
3. Refraction
4. Evaluating near vision: Amsler Grid and fields defects
5. Demonstrating aids
6. Teaching the patient to use aids
7. Guide to selected low vision aids
8. Fitting spectacles telescope and glasses
9. Children with low vision
10. Effects of the eye condition on functional vision
11. Light, glare and contrast in low vision care and rehabilitation
12. Diagnostic procedures in low vision cases management
13. Optics of low vision lenses
14. Bioptic telescopes
15. Optical devices to help people with field defects
16. Non-optical devices
17. Special visual acuity charts
18. Spectacle & Contact Lenses dispensing in low vision patients
19. Contrast sensitivity charts

BOPT 405: OCULAR DISEASES-II

1. COURSE OBJECTIVE

This course is designed to provide the further Optometrist with a comprehensive yet concise Curriculum of the field of Ophthalmology, with reference to ocular diseases. The course reviews basic background knowledge as well as focuses on specific areas of key interest to the Optometrist. Special attention will be paid to the methods of examination in various subspecialties of Ophthalmology.

COURSE OUTCOME:

The students will be knowledgeable in the following aspects of ocular diseases: knowledge on the epidemiology of the various eye related diseases the diagnosis based on the sign and symptoms of the disease with proper management also will perform clinical decision making for ocular abnormalities.

2. TEXT AND REFERENCE BOOKS:

a) Basic and Clinical Science Course- American Academy of Ophthalmology

b) Parsons Diseases of the eye - Stephen J. H. Mille, Churchill Livingstone

c) Clinical Ophthalmology - Jack J. Kanski, Butterworth

d) The Ocular Disease Manual - Meyler Robertson

e) Manual of ocular Fundus - Jones, Butterworth Heinemann

COURSE PLAN:

1. Vitreous

a) Development abnormalities

b) Hereditary hyaloido retinopathies Juvenile retinoschisis Cholesterolosis

c) Vitreous haemorrhage

Blunt trauma and the vitreous Inflammation and the vitreous Parasitic infestations

d) Vitreous complications in cataract surgery

2. Retina

a) Retinal vascular diseases

b) Diseases of the choroidal vasculature, Bruch's membrane, and retinal pigment epithelium

c) Retinal tumors and retinoblastoma

d) Other retinal disorders
   i. Retinal inflammations
   ii. Metabolic diseases affecting the retina
   iii. Miscellaneous disorders

3) Electromagnetic radiation effects on the retina

a) Retinal physiology and psychophysics

b) Hereditary macular disorders (including albinism)

c) Peripheral retinal degenerations

d) Retinal holes and detachments

e) Photocoagulation

4) Neuro Ophthalmology

a) Neuro Ophthalmic examination
   1) History and Visual function testing
   2) Technique of pupillary examination
   3) Ocular motility
   4) Check list for testing

b) Visual sensory system
   1) The retina, optic disc, optic nerve, optic tracts
   2) The lateral generculate body, optic radiations, visual complex
   3) The visual field
   4) Disorders of visual integration

c) Ocular motor system
   1) Supranuclear control of eye movements
      i) Saccadic system
      ii) Clinical disorders of the saccadic system Gaze palsies Parkinson's disease
      iii) Smooth pursuit system and disorders
      iv) Non-visual reflex system
      v) Position maintenance system
      vi) Nystagmus
   2) Ocular motor nerves and medial longitudinal fasciculus

d) The facial nerve

e) Pain and sensation from the eye

f) Autonomic nervous system disorders

g) Selected systemic disorders and Neuro - ophthalmologic signs

5) Lens

a) Anatomy and pathophysiology

1) Normal anatomy and aging process

2) Developmental defects

3) Acquired lenticular defects

b) Management of lenticular defect

6) Trauma

a. Anterior segment trauma

b. Posterior segment trauma

7) Blindness

a) Blindness- definitions

1) Causes

2) Social implications

3) Rationale in therapy

b) Drug induced ocular disease

BOPT 406: ENVIRONMENTAL SCIENCES

COURSE OBJECTIVE:
The importance of environmental science and environmental studies cannot be disputed. The need for sustainable development is a key to the future of mankind. Continuing problems of pollution, loss of forget, solid waste disposal, degradation of environment, issues like economic productivity and national security, Global warming, the depletion of ozone layer and loss of biodiversity have made everyone aware of environmental issues. Environmental management has captured the attention of health care managers. Managing environmental hazards has become very important. Environmental science is an interdisciplinary academic field that integrates physical, biological and information sciences (including ecology, biology, physics, chemistry, plant science, zoology, mineralogy, oceanology, limnology, soil science, geology and physical geography (geodesy), and atmospheric science) to the study of the environment, and the solution of environmental problems. Environmental science emerged from the fields of natural history and medicine during the Enlightenment.

COURSE OUTCOME:
Students should be able to appreciate concepts and methods from ecological and physical sciences and their application in environmental problems

REFERENCE:

a) Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.

b) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, email: mapin@icenet.net (R)

c) Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p

d) Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)

e) Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p

f) De A.K., Environmental Chemistry, Wiley Eastern Ltd.

g) Down to Earth, Centre for Science and Environment (R)

1: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance Need for public awareness.

2: NATURAL RESOURCES:

Renewable and non-renewable resources:

Natural resources and associated problems.

1. Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
2. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
3. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
4. Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer- pesticide problems, water logging, salinity, case studies.
5. Energy resources: Growing energy needs, renewable and non- renewable energy sources, use of alternate energy sources. Case studies.
6. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
   - Role of an individual in conservation of natural resources.
   - Equitable use of resources for sustainable lifestyles.

3: ECOSYSTEMS

1. Concept of an ecosystem.
2. Structure and function of an ecosystem.
3. Producers, consumers and decomposers.
4. Energy flow in the ecosystem.
5. Ecological succession.
6. Food chains, food webs and ecological pyramid
7. Introduction, types, characteristic features, structure and function of the following ecosystem: -
   a) Forest ecosystem
   b) Grassland ecosystem
   c) Desert ecosystem
   d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

4: BIODIVERSITY AND ITS CONSERVATION (6 LECTURES)

1. Introduction – Definition: Genetic, species and ecosystem diversity.
2. Biogeographical classification of India
3. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values
4. Biodiversity at global, National and local levels.
5. India as a mega-diversity nation
6. Hotspots of biodiversity.
7. Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts.
8. Endangered and endemic species of India
9. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. (8 lectures)

5: ENVIRONMENTAL POLLUTION DEFINITION

1. Cause, effects and control measures of: -
   a) Air pollution
   b) Water pollution
   c) Soil pollution
   d) Marine pollution
   e) Noise pollution
   f) Thermal pollution
   g) Nuclear hazards
2. Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
3. Role of an individual in prevention of pollution.
4. Pollution case studies.
   Disaster management: floods, earthquake, cyclone and landslides.

6: SOCIAL ISSUES AND THE ENVIRONMENT

1. From Unsustainable to Sustainable development
2. Urban problems related to energy
3. Water conservation, rainwater harvesting, watershed management
4. Resettlement and rehabilitation of people; its problems and concerns. Case Studies
5. Environmental ethics: Issues and possible solutions.

6. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and
7. holocaust. Case Studies.
8. Wasteland reclamation.
9. Consumerism and waste products.
10. Environment Protection Act.
11. Air (Prevention and Control of Pollution) Act
12. Water (Prevention and control of Pollution) Act
13. Wildlife Protection Act
14. Forest Conservation Act
15. Issues involved in enforcement of environmental legislation.
16. Public awareness.

7: HUMAN POPULATION AND THE ENVIRONMENT

1. Population growth, variation among nations.
2. Population explosion – Family Welfare Programme.
3. Environment and human health.
4. Human Rights.
5. Value Education.
6. HIV/ AIDS
7. Women and Child Welfare.
8. Role of Information Technology in Environment and human health.
9. Case Studies.

8: FIELD WORK

1. Visit to a local area to document environmental assets- river / forest / grass l and / hill / mountain
2. Visit to a local polluted site- Urban / Rural / Industrial / Agricultural
3. Study of common plants, insects, birds.
4. Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours

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