ORDINANCES

BACHELOR OF SCIENCE IN JEWELLERY DESIGN (B.Sc.-JD)

1. The duration of B.Sc. in Jewellery Design shall be Three Academic Year consisting of six semesters i.e. two semesters in each academic year.

2. Each semester will be about ninety working days followed by an examination conducted by the University and a small term break / summer vacations.

3. Admission to B.Sc. in Jewellery Design is opened to a candidate who has passed Intermediate Examination of the Board of High School and Intermediate Education U.P., Allahabad or an equivalent examination with 45% marks (40% marks in case of SC/ST category candidates).

4. The admission will be governed by the rules prescribed by the State Government / University from time to time. 45% — 40%. 10+2 all streams

5. Ordinarily the examination for I, III & V semesters will be held in the month of Decembers and for II, IV & VI semesters in the month of May every year.

6. Medium of Instructions and Examinations will be English.

7. Student must put in a minimum of 75% attendance in every paper in each semester. A student who has not put in the required attendance in any course(s) shall not be allowed to take the examination in such course(s). He / she can do so only after acqqiring the stipulated attendance by repeating the course. However, he/she will be allowed to proceed to the next semester.

8. The minimum pass marks (including internal assessment) shall be 40% in each Theory paper and 40% in Practical separately and 50% in aggregate.

9. In the first five semesters the candidate will be declared only as "PASS" or "FAIL" or eligible for appearing in "Back-Paper". Division shall be awarded on the basis of combined result of all the six semesters.

10. Successful candidates shall be classified on the basis of combined result of six semesters as under:

    (i) 60% and above - First Division

    (ii) 50% and above but less than 60% - Second Division

    There will be no Third Division.

11. Candidate shall be allowed to use simple calculator during the examination wherever permitted by the paper setter.

12. The candidate shall be required to pass separately in Theory & Practical.

13. **Rules for promotion**: Anything omitted may be treated as per professional courses rules & regulations of the University.

14. The examination of back paper will be held along with the next corresponding semester examination.

15. A candidate shall have to complete the course in a maximum duration of six year after his/her admission to first semester of the course.

16. All the paper setters / examiners shall ordinarily be external.

17. Each theory examination paper will be of three hours duration. The maximum marks allotted for each paper shall be as per scheme of evaluation.

18. No candidate will be allowed to join any other degree course from the same or different university in regular / private / distance mode. However, admission to certificate course may be allowed if they are scheduled under a different timetable set than the current course.

INTRODUCTION

There is a growing desire among school leavers to pursue a career in design. The advent of modern technology has created changes in the lifestyles of people leading to a change in perception of Body decoration. Jewellery no longer fulfills the socio-economic relevance in one's environment but move on to another dimension altogether of making a style statement thus necessitating the need to study this area with a greater intent. Therefore, trained design professionals are the express need of the hour. Curriculum for Bachelor of Science in Jewellery Design (BSc-JD) has been prepared keeping the needs of the customer, the industry and the prevailing sociocultural environment. Classroom teaching, socio-cultural exposure and industry interaction and training will equip the students to face these challenges.

With the integration of domestic and export markets, the Indian industry needs Jewellery design professional with in-depth knowledge and skills relating to design innovation and technology. There is also a domestic and international pressure on Indians to come up with original design inputs. This presents challenges for the upcoming design professionals to demonstrate their personal design philosophy, perpetuate innovation and creativity.

This curriculum has a good balance of theory, Practical, studio and participative industry related activities and experiences directed towards market realities. Learning and experience of the Jewellery sector will further enable the students to be sensitive to our country's rich traditional Jewellery / Ornaments heritage. The Craft sector is also one area where there is a whole new set of opportunities in Jewellery education. Therefore the learning and training imparted through this curriculum can trickle down to grass root levels.

Main Objectives of the course

- To satiate the Jewellery industry by inducting professionals who are well versed with design and technology specific to the jewellery industry.
- To introduce the process of design & understanding of materials for design development in precious, semi precious and costume jewellery segments.
- To provide knowledge for appreciation of the market and relate issues for identifying the area of specialization where placement is sought.

Main Features of Program:

- This being a specialist course will cater to all who have interest in taking up a career in the field of Jewellery.
- This is a three- year degree program
- The suggestion is to have an option for lateral entry in the second year for students studying jewellery as a vocational course else-where.
- Completing and clearing the three- year program will entitle the student for a degree.
- The program consists of two important areas in the field
  1. Technology(Diamonds and Diamond grading, Gemology, Metals and manufacturing).
  2. Design(The process and skills required to design).
- The course shall have two industry interactions, one after the second year and the other one in the final semester of the program.

The program aims to provide learners with:

- Awareness of the historical and theoretical context of jewellery within the broader field of design.
- Requisite skills and knowledge to develop as a designer and practitioner in the subject area.
- Knowledge and understanding of the technological processes and materials relevant to the jewellery, silversmithing and allied trades.
- Specific understanding of technical areas like Diamond and diamond grading, gemology and manufacturing techniques.
- An appreciation of new technologies affecting the industry.
- Ability to generate design concepts and the facility to translate through two and three dimensions into functional products.
- Necessary business acumen for employment.

Visits

The faculty should be encouraged to organize visits for the students so that they can supplement classroom teaching with down to earth experiences and shop floor work culture. It helps them in visualizing and rationalizing different approaches for problem solving. The visits should be to crafts fairs and melas, exhibitions and summits, designer studios, export houses, retail stores, production units.

Seminars and Conferences

The need for organizing and attending seminars and conferences has been universally recognized. Therefore, it is of paramount importance that the institute offering a design program should have an inbuilt proposal in their annual budget to organize seminars and conferences as and when feasible in various aspects of Jewellery Design Education. The budget should also have a provision for facilitating the faculty and students to participate in seminars and conferences being organized by other institutes and trade bodies etc.

Faculty

The institutes offering this course have to be extremely committed in harnessing qualified, committed and experienced faculty who will be able to provide desirable, effective and sustainable inputs for the course. They should also be able to create an environment for the development of young students with appropriate and multifaceted design capabilities. The students should be nurtured to have their individual philosophies which are developed to meet the needs of the environment in which they are going to be absorbed.

Therefore, an eye only on the workload of the faculty is not the right approach. It is true that the number of faculty required for the effective dispensation of this course will be more due to the variety of areas in which the teaching and learning has to take place. Moreover, sixty to seventy percent of teaching is practicals where interaction between students and teachers is on one to one basis and therefore more intense and interactive.

A crucial point which must be mentioned is that the institutes must bear the responsibility for faculty upgradation and therefore must have a Faculty Development Program policy in place wherein the faculty are encouraged, supported to pursue higher studies, participate in conferences, seminars, visits etc. as well as enroll for relevant training programs. The institutes should not load the faculty with such responsibilities which divert their attention from their primary responsibility of teaching, training and research.

Institutional Support

Institutes opting to offer this course would be required to provide support to these students in the following areas for the success of this course

- Industry exposure - suitable interaction with the industry
- By way of special lectures, frequent visits and training at the industry as and when advocated in the curriculum and planned by the faculty. The industry would include:-
  - Export houses
  - Forecasting agencies
  - Small enterprises
  - Retail Lifestyle Accessories & Fashion Brands

Evaluation

For this Jewellery Design course, the theory subjects' accountt for only thirty to forty percent of the curriculum, the rest of the sixty to seventy percent are studio / lab based inputs. Therefore the written exams are very few. In studio / lab subjects the evaluation is based on their day to day performance, assignments / portfolios / reports / projects etc. submitted and presentations before a panel of jury members.

Learning Outcomes of the Three Year Course

The course aims to develop in students:

Subject Knowledge - by the end of this program, the student should be able to:

- Demonstrate basic design awareness of historical, cultural & contemporary design issues and respond with design intelligence.
- Develop the knowledge of designs, colors, materials and techniques and apply the same to create technically sound designs.
- Demonstrate awareness of basic design concepts and exploratory skills required to manipulate materials into shapes and forms with a complete understanding of various characteristics of materials.
- Apply the understanding of Diamond and gemstones study.

Understanding - by the end of this program, the student should be able to:

- Apply the learning of evolution and major periods in history of art and Design
- Develop basic understanding of existence of various socio-cultural factors that affect the design preferences of individuals.
- Inculcate the awareness of resources of designs available from the general surroundings and to produce customized Jewellery.

FIRST SEMESTER
Bachelor of Science in Jewellery Design

BSCJD-101: FUNDAMENTALS OF JEWELLERY

DURATION:28 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Introduction to Jewellery
2. Categories of Jewellery
3. Form and Function of Jewellery
4. Materials and Methods
5. Findings and clasps, metal finishes
6. Different types of Stone settings

BSCJD-102: FUNDAMENTALS OF GEMMOLOGY

DURATION:28 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Introduction
2. Visual Observations
3. Geological occurrence
4. Physical Properties
5. Crystallography
6. Optics

BSCJD-103: HISTORY OF ART & DESIGN, VISUAL CULTURE

DURATION: 28 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

From Indus Valley Civilization to present day Note:
(i) Should be taught in a story form.
(ii) Emphasis should not be on chronology but on evolution of art forms.

1. **Indus Valley Civilization** (2500 B.C. - 500 B.C.) - Sculpture Lime Stone priest. Torso, Bronze Dancing Girls, Seals, Terra-cotta, Mother Goddesses, Pottery, Jewelry.
2. **Mauryan Empire** - Pillar inscription, Sarnath Capital, Yaksha figures, Lomasha Rishi Cave, Animal Carvings, Terra-cotta.
3. **Sunga Period** - Stupa and Toranas: Sculpture Barthut-Shalabhanjika, Relief Medallion MrigaJakata. Viharas and Chaitya (Katie and Bhaja).

4. **Kushan Period - Gandhara School** - Standing Buddha from HotiMardan, Nirvan of
5. Buddha of Katra.
6. **Gupta Period** - Sculpture. Standing Buddha from Mathura painting, Ajanta, Bodhisativa Cave No.1, Apsaras Cave No. 17, Architecture. Vishu-Temple-Deoghar.
7. **Medieval Period of Hindu Dynasties with special references to South India**(1) Pallava Dynasty, Mahabalipuram - Gangavataran, Panchrath
8. (2) Rashtrakuta Dynasty; Ellora-Kaissasa temple, Elephanta-Maheshmurti (3) Chandela Dynasty: Khajurao (Nagar Style), Kandariya Mahadeo temple.
9. (4) Konark (Orissa Style), Sun temple.
10. Kangta — Bhagwatpuran, Ragamala, Baramasa.
11. **Indian Miniatures**
    Moghal Miniatures - Akbar School: Illustration from Babar Namah and Akbar Namah.
    Jahangir School - Study of animals and birds.
    Shahajahan School - Portrait of Shahajahan.
    Rajput Miniatures - Basholi - Adbhisarika Nayika. Kangra - Bhagwatpurana, Ragamala, Baramasa.
12. **Contemporary Scene** - Introduction of about twenty Indian Artists (Painters and Sculptors) Art movements in Bombay, Calcutta, Madras, Delhi, Baroda.

BSCJD-104: DRAWING & SKETCHING

DURATION:56 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Introduction to sketching
2. Model drawing
3. Still life
4. Drawing in an active environment
5. Free hand perspective drawing
6. Field trip to place of visual interest
7: Capture movement

BSCJD-105: ILLUSTRATION AND RENDERING

DURATION:56 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. METAL RENDERINGS
   - Yellow gold (sphere, dome, knife-edge, flat sheet)
   - White gold (sphere, dome, knife-edge, flat sheet)
   - square cut outs (yellow & white gold)
   - round cut outs (yellow & white gold)

7. GEMSTONE RENDERINGS
   - Faceted (diamonds, colored stones)
   - Cabachons (transparent, translucent, opaque)
   - Pearls, beads

BSCJD-106: THEME BASED DESIGN PROJECT

DURATION: 112 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Selection of theme
2. Development of theme board
3. Brainstorming and mind mapping exercise
4. Market research
5. Concept generation
6. Material specification
7. Evaluation and selection
8. Renderings

SECONDSEMESTER
Bachelor of Science in Jewellery Design

BSCJD-201: HISTORY OF JEWELLERY

DURATION:28 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Origin of Jewellery.
2. Development through ages.
3. Historical aspects of craft and trade.
4. History of ornamentation. Its awareness and appreciation in various cultures.
5. Tribal Jewellery
6. Jewellery from different States.
7. Art & Design Movement -Victorian, Art Deco. Art Nouveau Baroque, Edwardian Periods.
8. Advancement of Techniques in India.

BSCJD-202: ADVANCED GEMMOLOGY

DURATION:42 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Colored Gemstones in the R.I 1.4-1.5
2. R.I 1.5-1.6
3. R.I 1.6-1.7
4. R.I 1.7-1.8
5. Overage R.I
6. Organics
7. Synthetics
8. Enhancement Treatments

BSCJD-203: COMPUTER FUNDAMENTALS

DURATION 42 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Introduction to computers
2. Basic softwares "Microsoft Office"
3. Applications

BSCJD-204: CAD APPLICATION (COREL DRAW)

DURATION: 46 Hrs
MAX. MARKS:60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

Mastering Computer Graphics Skill using Corel Draw

1. Introduction to CorelDraw
2. Working with Shapes, Lines, Texts & Objects
3. Working with outlines and Fills:
4. Working with Curves:
5. Special Effects:
6. Layouts (Development of different types of Boards)
7. Drawing Basic ornaments in Corel Draw with Grids and Guidelines and Converting them into Objects
8. Saving and Exporting Images.
9. Printing Images

BSCJD-205: PROJECT ON GEMMOLOGY

DURATION: 70 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Project on the Navratnas and their astrological Relevance
2. Project on Symbolic and religious connotation of Jewellery in India
3. Project on Healing properties of Gemstones

BSCJD-206: HISTORY BASED DESIGN PROJECT

DURATION: 80 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

4. Selection of Design period relevant to Indian Jewellery (Mauryan, sunga, Mughal)
5. Development of theme board
6. Brainstorming and mind mapping exercise
7. Market research
8. Concept generation
9. Material specification
10. Evaluation and selection
11. Renderings

THIRD SEMESTER

Bachelor of Science in Jewellery Design

BSCJD-301: STUDY OF INTERNATIONAL MARKETS BASED ON CONSUMER DEMOGRAPHIC RESEARCH AND ANALYSIS

DURATION:56 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Examples of global products and services
2. Key features of global success and failure which are essential for designers to understand.
3. Appreciate the importance of understanding cultural differences in designing internationally
4. Understand how design differentiation can contribute to global success

BSCJD-302WEIGHT AND COST ESTIMATION

DURATION:42 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Weight estimation based on specific gravity of Metal
2. Cost estimation based on metal weight and gemstone costing

BSCJD-303: ORTHOGRAPHIC VIEW

DURATION:56 Hrs
MAX. MARKS: 60 (EXAMS) PASS MARKS: 40
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Ring shanks - flat band, dome, knife- edge, criss - cross
2. Ring shanks with settings

BSCJD-304: DIAMOND AND DIAMOND GRADING

DURATION:154 Hrs
MAX. MARKS: (60+150)
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Diamond
2. Diamond Formation and Mining
3. Diamond Extraction
4. Source
5. Cutting
6. Physical Properties
7. Optical Properties
8. Clarity
9. Cut (Fancy Cut)
10. Carat Weight
11. Colour (Fancy Colour)
12. Treatments
13. Synthetics
14. Simulants

FOURTHSEMESTER
Bachelor of Science in Jewellery Design

BSCJD-401: SURFACE ORNAMENTATION AND DEVELOPMENT

DURATION:56 Hrs
MAX. MARKS: (60+60)
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Surface ornamentation without heat
2. Cold joining (engraving, scoring, chip carving, metal inlay, acid etching).
3. Surface ornament with heat (reticulation, fusing metal, granulation)

BSCJD-402: Fundamentals of Management and Marketing

DURATION: 40 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

A. Fundamentals of Management
1. Introduction to management
2. Introduction to the theories of management
3. Management Functions & skills
4. Fundamentals of Planning

B. Fundamentals of Marketing
1. Principals of marketing, marketing research, marketing environment
2. Understanding of the consumer
3. Market and prototype testing
4. Segmenting the market selecting the target market and marketing mix.
5. Various sales promotion techniques and the importance of advertising, sponsorship and public relations.

BSCJD-403: DIAMOND ASSORTING AND VALUATION

DURATION:42 Hrs
MAX. MARKS:60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. White Diamond and other Assortment
2. Rejection & Selection
3. Clarity Grading (White,L.B,L.C,Natts etc.)

4. Color Grading (White.L.B.L.C.Natts etc)
5. Cut Valuation
6. Color Valuation
7. Clarity Valuation
8. Grouping , Semi & Full Assortment
9. Pricing of Loose Diamond
10. Practical Training According to Market
11. Educational Tours - Surat, Mumbai, Jaipur etc.
12. Rapaport Valuation
13. Rules Regulation of Market as per Sales & Purchase
14. Valuation for certified or Non Certified Diamond

BSCJD-404: DESIGN PROJECT ON MARKET ANALYSIS

DURATION: 100 Hrs
MAX. MARKS:60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1.Study various collections of different jewellery exhibitions and shows occurred.
2. To develop a story line comprising of latest predictions.
3. Presentation of own creativity adapting the designer's forecast.
4. Developing own forecast and making a range on it.

BSCJD-405: COMPUTER APPLICATION 3D MATRIX

DURATION:70 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Introduction to Rhino and Matrix
2. Gem tools,
3. Bezel Builder
4. V-Ray Rendering.
5. Other tools like Profile Sweep, Curve from Two Views, Helix, Pipe, Extrude Curve etc
6. Explore the power of Smartflow and learn how to create Halo settings etc.

FIFTH SEMESTER
Bachelor of Science in Jewellery Design

BSCJD-501: RETAIL OF JEWELLERY

DURATION: 100 Hrs
MAX. MARKS: 60
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Retail - An Introduction as an activity
2. The Retail Environment
3. The Growing importance of the retail industry
4. The study of retailing, Retail Definition, Report Format,The structure of retailing in USA, UK, Europe and India
5. Types of Retail Operations.
6. Ethics in Retail

BSCJD-502: BASIC MANUFACTURING TECHNOLOGY

DURATION: 100 Hrs
MAX. MARKS: (60+100)
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Precious metals (gold, silver, platinum) and their mining.
2. Methods of refinement and recovery from ores
3. Assaying, application in jewellery
4. Alloying of the precious metals
5. Making metals ready for jewellery making, cartage in gold-applications in jewellery-22 carat, 18 carat, 16 carat etc. quality control–lowering or raising metal quality and its application in jewellery;
6. Hallmarking, standard weights and measures.
7. **Processes involved in gold smithing :**Traditional manufacturing techniques Kundan, Meenakari, Chain making, Working with sheet metal (doming, repousse and chasing, stamping). Wire (shaping and bending, spiral making, twisted wire)- the manufacturing process and its drawbacks; Filigree- the manufacturing process and its drawbacks; Advancement of techniques.

BSCJD-503: ADVANCED MANUFACTURING TECHNOLOGY

DURATION:100 Hrs
MAX. MARKS: (60+100) PASS MARKS: 40
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Mass Production, Organizational set-up of jewellery industry. Metalworking vs. Jewelry Manufacturing, Metal Accountability
2. Coordination from design to dispatch
3. Manufacturing Cost Reductions
4. Processes of Investment Casting, Metal Fabrication, Case Study
5. Relationship between Design & Technology
6. Drawbacks of mass production
7. Quality control of metal.

SIXTH SEMESTER

Bachelor of Science in Jewellery Design

BSCJD-601: PROJECT ON ADVANCED MANUFACTURING

DURATION: 70 Hrs
MAX. MARKS: 150
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

1. Casting (gravity pour casting – development of casting techniques, cuttlebone casting, lost wax casting – wax composition for investment casting, types of wax, centrifugal casting)
2. Metal finishing and patinas - colouring metals-colouring process, anodising metals, titanium colouring.
3. CAD Application to CAM

BSCJD-602: INTERNSHIP

DURATION:240 Hrs
MAX. MARKS:300 PASS MARKS: 40
UNIV. SEM END EXAMINATION

OUTLINE SYLLABUS:

The primary focus will be upon developing a collection or individual piece of jewellery which will demonstrate the students ability to be highly innovative and creative whilst at the same time exhibiting commercial awareness and knowledge of the consumer market which the work is intended for. The Industry Interface will illustrate design ability of the jeweller through problem solving, fresh thinking and well executed design

Note: 6 Hrs per day and 6 to 8 weeks

Dated : 01.05.2019

To,

The Vice Chancellor
Ch. Charan Singh University,
Meerut.

Sir,

This is in reference to the RDC meeting regarding Home Science held on May, 01, 2019. Post discussion of the Home Science B.Sc. Syllabus, it was decided that the division of marks in 3 years (6 semster) will be as mentioned below.

	Theory Papers	**Int. Assessment**	**Ext. Practical Exam**	**G.Total**
Total No. of Th. Papers (6 semester)	35	09	13	
M. Marks	2075	225	700	3000

Request for your approval on the same.

Thanking you,

Yours Sincerely

01.05.19

(Dr. Archana Sharma)
Principal
R.G. (P.G.) College,
Meerut

Honourable Vice-Chancellor,
The current status of external practicals are proposed to be 13 as against 25 till now. The same is proposed to be implemented from session 2019-20 (i.e. from B.Sc. Home Science part I).
Submitted for your kind approval after perusal Sir.
5/5/19

To,

The Vice Chancellor

Chaudhary Charan Singh University,

Meerut.

PVC/365
02/5/19

From :

Raghunath Girls' (P.G.) College,
(NAAC REACCREDITED 'A' GRADE)
W. K. Road, Meerut - 250001 (U.P.)
Ph. : 0121-2642901

B.Sc Home Science (I, II, III, IV, V, VI) Semester 2019 – Onwards

Ist Semester

S.No.	Titles	Th.	Int. Ass.	Ext. Practical	Total
1	English Language and Communication skill	50	-	-	50
2	Communication and Instructional Technology	75	-	25	100
3	Computer Basic	75	-	25	100
4	Introduction to Human Development	50	25		75
5	Food Science	50		50	100
6	Human Physiology	50	25	-	75
7	Environmental Science-Qualifying Paper		-	-	
	Total	350	50	100	500

IInd Semester

S.No.	Titles	Th.	Int. Ass.	Ext. Practical	Total
1	Introduction to Textiles	50	-	25	75
2	Laundry Science and Finishing of Fabrics	50	-	25	75
3	Applied Physics	50	-	25	75
4	Applied Chemistry	50	-	25	75
5	Introduction to Resource Management	100	-	-	100
6	Meal Management	50	-	50	100
	Total	350	-	150	500

IIIrd Semester

S.No.	Titles	Th.	Int. Ass.	Ext. Practical	Total
1	Family Dynamics	50	-	-	50
2	Human Development	75	25	-	100
3	Consumer Economics	75	-	-	75
4	Nutritional Bio-Chemistry	50	-	50	100
5	Sanitation and Hygiene	75	25	-	100
6	Applied life Science-I	75	-	-	75
	Total	400	50	50	500

IVth Semester

S.No.	Titles	Th.	Int. Ass.	Ext. Practical	Total
1	Introduction to clothing Construction	50	-	50	100
2	House Hold Equipments	75	25	-	100
3	Food Microbiology	50	-	50	100
4	Applied Life Sciences	75	25	-	100
5	Human Development	50	-	-	50
6	Community Nutrition	50	-	-	50
	Total	350	50	100	500

Vth Semester

S.No.	Titles	Th.	Int. Ass.	Ext. Practical	Total
1	Therapeutic	50	-	50	100
2	Human Development	75	25	-	100
3	Community Development	50	-	-	50
4	Family Housing	50	-	25	75
5	Advanced Clothing Construction	50	-	25	75
6	Nursery School Education	75	25	-	100
	Total	350	50	100	500

VIth Semester

S.No.	Titles	Th.	Int. Ass.	Ext. Practical	Total
1	Textile Designing	50	-	50	100
2	Interior Decoration and Principles	50	-	50	100
3	Food Preservation and Protection	50	25	-	75
4	Entrepreneurship & Motivation	75	-	50	125
5	Extension Training and Management	50	-	50	100
	Total	275	25	200	500
	Grand Total	2075	225	700	3000

1. **Prof. Vimala Y. Dean, Faculty of Science**
2. **Prof. Y.Singh, Dean Faculty of Arts**
3. **Dr. Archana Sharma, Acting Principal, RG PG Coll. Meerut.**
4. **Dr. Uma Joshi, VMLG Coll. Ghaziabad (Convener-I)**
5. **Dr. Nisha Shukla, MLJ, College, GZB**

Dated 1-5-19

B. Sc.

Home Science (I, II, III, IV, V, VI) Semester

2019 – Onwards

I Semester

S.No	Titles	Th.	Int. Ass.	Ex. Practical	Total
1	English Language and Communication skill	50	–	—	50
2.	Communication and Instructional Technology	75		25 Ex+T.P	100
3.	Computer Basic	75		25	100.
4.	Introduction to Human Development	50	25		75
5.	Food Science	50		50	100
6.	Human Physiology	50	25		75
7.	Environmental Science - Qualifying Paper				
	Total	350	50	100	500

II nd Semester

1.	Introduction to Textiles	50	25	25	75
2.	Laundry Science and finishing of fabrics	50	25	25	75
3.	Applied Physics	50		25	75
4.	Applied chemistry	50		25	75
5.	Introduction to Resource Management	50			50
6.	Meal Management.	50		50	100
	Total	350		150	500

III Semester

S.No.	Titles	Th.	Int. Ass.	Practical	Total
1	Family Dynamics	50	–	–	50
2.	Human Development	75	25		100
3.	Consumer Economics	75	–	–	75
4.	Nutritional Bio-chemistry	50		50	100
5	Sanitation and Hygiene	75	25		100
6.	Applied life Science - I	75		–	75
	Total	400	50	50	500

IV Semester

1.	Introduction to Clothing Construction	50		50	100
2.	House Hold Equipments	75	25		100
3.	Food Microbiology	50		50	100
4	Applied Life Sciences	75	25		100
5.	Human Development	50	–	–	50
6	Community Nutrition	50	–	–	50
	Total				500

15/11/19

V Semester

S.No	Titles	Th.	Int. Ass.	Practical	Total
1	Therapeutic Nutrition	50		50	100
2.	Human Development	75	25		100
3.	Community Development	50	—	—	50
4.	Family Housing	50		25	75
5.	Advanced clothing Construction	50		25	75
6	Nursery School Education	75	25	—	100
	Total	350	50	100	500

VI Semester

1.	Textile Designing	50		50	100
2.	Interior Decoration and ~~Art~~ Principles.	50		50	100
3.	Food Preservation and Protection	50	25		75
4.	Enterprenuership & Motivation	75		50	125
5.	Extension Training and Management	50		50	100
	Total	225	25	200	500
	Grand Total	2[illegible]	[illegible]	[illegible]	3000

Dr. Archana Sharma

Proceeding of the Meeting

Sub: Syllabus of Research Methodology and Computer Applications (Paper-1) for the Pre-Ph. D. Course work in Physical Sciences

Date: 21-06-2018

Venue: Department of Mathematics

Members Present:

Prof. Y. Vimala, Dean Science, Department of Botany, C.C.S. University, Meerut
Prof. M.K. Gupta, Department of Mathematics, C.C.S. University, Meerut
Prof. Hare Krishna, Department of Statistics, C.C.S. University, Meerut
Prof. R. K. Soni, Department of Chemistry, C.C.S. University, Meerut
Prof. Beer Pal, Department of Physics, C.C.S. University, Meerut
Prof. Jaimala (Convener), Department of Mathematics, C.C.S. University, Meerut

Agenda 1: To separate Physical Sciences from Life Sciences in the reference of paper-1: Research Methodology and Computer Applications of Pre-Ph. D. Course work.

Recommendation: It was recommended by the committee that due to some constraints regarding the different requirements of the two major constituents of the science faculty: Life Sciences and Physical Sciences, the paper-1: Research Methodology and Computer Applications of Pre-Ph. D. Course work, which was commonly constituted for the whole science faculty and was run accordingly should be framed and run separately for the Physical Sciences.

Agenda 2: Framing of the Syllabus of the paper-1: Research Methodology and Computer Applications of Pre-Ph. D. Course work.

Recommendation: The committee proposes/recommends the attached syllabus for the departments falling under physical sciences including the Chemistry Department. It also recommends that the syllabus will be adopted once it is approved by the Board of Studies of any of the concerned departments. Since the Board of Studies is to be held very shortly for Mathematics it will be presented there for approval. Successively it will be implemented from the session-2018, in anticipation of its final approval by the Academic Council.

Agenda 3: Where to run the course?

Recommendation: The Committee recommends that the course will be run either for all the departments of physical sciences by the constituent departments one by one in the alphabetical order or by more than one department again as per the alphabetical order or if required by all the departments individually. This year (i.e. in 2018) overall there are almost 52 students in physical sciences and the turn of running the course is of the Department of Mathematics, therefore the course will be run by the Department of Mathematics.

(Y. Vimala) (Hare Krishna) (R.K. Soni) (Beer Pal Singh) (Jaimala)

Enclosure: The Syllabus of Research Methodology and Computer Applications (Paper-1) for the Pre-Ph. D. Course work in Physical Sciences.

Submitted to the Hon'ble Vice-Chancellor for his kind perusal and approval.

Pre-Ph.D. Course Work (2018 onwards)

(H-049) Research Methodology and Computer Applications (Physical Sciences including Chemistry)

This course is common for doctoral research students of all the subjects under Physical Sciences faculty. The objective of the course is to acquaint research students with scientific research methods and quantitative techniques.

Syllabus

Unit I: Perception & Definition of Research, Objectives & Motivations of Research, Importance of Research, Types of Research, Research Methods versus Methodology, Process of Research, Review of Literature, Formulation of the Research Problem, Sources and Identification of a Research Problem, Status of the Research Problem, Formulation of Hypothesis, Research Design, Ethics in Research.

Unit II: Synopsis, Funding Agencies in India for Research in Physical Sciences, Project Proposal, Project Report Writing, Research Paper Writing, Thesis Writing, Referencing, Formats of Writing References, Bibliography, Plagiarism, IPR, Technology Development and Transfer.

Unit III: Types and Sources of Data, Data Collection Methods, Analysis of Data, Central Tendency, Dispersion, Skewness, Correlation, Regression, Probability (Elementary), Binomial, Poisson and Normal Distribution, Sampling Distributions for Mean and Variance, Chi-square test, t-test and F-test,

Unit IV: Computer Networking, Internet, Web Brcwsers, Search Engines, MS Word: Handling graphics tables and charts, Formatting in MS-Word, MS Powerpoint: Creating Slide Show, Screen Layout and Views, Applying Design Template, MS Excel: Features, Formulas and Functions, Data Analysis and Data Visualization in Excel.

Unit V: Subject Classification Index, Citation, Citation Index, Impact Factor, h-index, i-10 index, INFLIBNET, Introduction to Peer Reviewed and Open Access Journals, e-Journals, e-Library, Research Databases in Physical Sciences: Web of Science, Scopus, Science-Direct etc.

REFERENCES BOOKS

1. **R. Kumar: Research Methodology: A Step by Step Guide for Beginners** (3rd Edition), SAGE, Inc., 2011.
2. **W. Creswell: Research Design, Qualitative, Quantitative and Mixed Methods Approaches** (3rd Edition), SAGE, Inc., 2018.
3. **S. Melville and W. Goddard: Research Methodology: An Introduction** (2nd edition), Juta Academic, 2004.
4. **S.P. Gupta: Statistical Methods**, Sultan Chand & Sons, 2014.
5. **T. Shortis: The Language of ICT: Information and Communication Technology**, Taylor & Francis, 2016.
6. **S. Gupta: Research Methodology: Methods and Statistical Techniques**, Deep & Deep Publications, 2010.

VC 0/17/9/18
23/5/19

DEPARTMENT OF MICROBIOLOGY
CH. CHARAN SINGH UNIVERSITY
MEERUT

As per letter no. Committee Cell (BOS-Micro)/3985 dated 29.04.2019, a meeting of the Board of Studies in Microbiology of Campus and Affiliated Colleges for finalizing and revising the syllabi exam pattern of **M.Phil. Microbiology and B.Sc. Food Microbiology, Safety & Quality Control** run in the campus, and revising the syllabi of B.Sc. Microbiology and M.Sc. Microbiology run in the affiliated colleges was held at 2:00 p.m. on 30-04-2019 in committee room for implementation *w.e.f.* the session 2019-2020. Following members were present:

1. Prof. Y. Vimala, Dean of Science & Head, Department of Microbiology, C.C.S, University, Meerut. - Convener
2. Professor V.P. Singh, (Retd.), Department of Botany, University of Delhi, Delhi - Subject Expert.
3. Professor S.K. Bhatnagar, (Retd.), Department of Biotechnology, SVBP Agriculture University, NH-58, Meerut, - Subject expert.
4. Dr. Shalini Sharma, Principal, Professional Courses, affiliated to CCS University, MIET, Meerut, - Special Invitee.

I. The Committee went through the course contents and the Ordinances of **M.Phil (Microbiology)** and 3 year course of **B.Sc. (Food Microbiology, Safety & Quality Control)** and approved detailed course contents of the same *w.e.f.* the session 2019-2020. The examination pattern of B.Sc. (Food Microbiology, Safety and Quality Control) was revised including a component of Internal assessment of 50 marks and awarding total marks as an average of external and internal marks. This system will be applicable from session 2019-20 on 2nd, 3rd & Ist year B.Sc. (F.M.S.&Q.C.).

II. In B.Sc. Microbiology Ist year, paper B-106 of Biophysics, modification in the syllabus was done. In paper B-205 of 2nd year additions to Unit III & IV were done. For M.Sc. Microbiology (S.F.) run in affiliated colleges of the University, the syllabus of M.Sc. Applied Microbiology (S.F.) run in the campus with 4 specilizations and project has been proposed to be adopted. New series of GM codes may be allotted to all the papers.

		Shalini 30/4/19	30/4/19
(V.P. Singh)	**(S.K. Bhatnagar)**	**(Shalini Sharma)**	**(Y. Vimala)**
Subject Expert	Subject Expert	Special Invitee	Dean & Head

Submitted for kind perusal and approval of the Hon'ble Vice-Chancellor.

ORDINANCES FOR

2- year Post-graduate Course

M.Sc. Microbiology
(under Self Finance Scheme)

From the session 2019-20

For
Affiliated Colleges only
All Departments of Microbiology
Ch. Charan Singh University
Meerut

30/4/19

30/4/19

M.Sc. (Microbiology) Syllabus, C.C.S. University, Meerut
Effective from the session 2019-2020

S.N.	Course no.	NGMe of the course	Internal (M.M.)	External (M.M.)
		FIRST SEMESTER		
1	GM 101	Instrumentation and Microbial Techniques	50	50
2	GM 102	Microbial Diversity- Prokaryotes and Viruses	50	50
3	GM 103	Microbial Diversity- Eukaryotes	50	50
4	GM 104	Biostatistics, Computer Applications and Bioinformatics	50	50
5	GM 105	**Practical**		100
		SECOND SEMESTER		
6	GM 201	Microbial Physiology and Biochemistry	50	50
7	GM 202	Microbial Genetics, Molecular Biology and Genetic Engineering	50	50
8	GM 203	Agricultural Microbiology	50	50
9	GM 204	Microbial Environmental Technology	50	50
10	GM 205	**Practical**		100
		THIRD SEMESTER		
11	GM 301	Medical Microbiology	50	50
12	GM 302	Molecular Immunology	50	50
13	GM 303	Food and Dairy Microbiology	50	50
14	GM 304	Industrial Microbiology	50	50
15	GM 305	**Practical**		100
		FOURTH SEMESTER		
16	GM 401	Project Report including Viva-voce	400	
17	GM 402	Medical Microbiology } Any one of 4	100	
18	GM 403	Industrial Microbiology } Any one of 4		
19	GM 404	Agricultural Microbiology } Any one of 4		
20	GM 405	Environmental Microbiology } Any one of 4		
		Total Marks	**2000**	

30/4/19

30/4/19

30/4/19

ORDINANCES FOR

3- year-Degree Course

B.Sc. (Food

Microbiology, Safety and Quality Control)

(under Self Finance Scheme)

From the session 2019-20

on all years (current inclusive)

Department of Microbiology

Ch. Charan Singh University

30/4/2019

30/4/19 30/4/19 30/4/19

Meerut

Overview

Food microbiology, safety and quality control is the basic requirement of public health and hygiene. Food microbiology is the necessary and essential requirement of every food industry. The consumers, retailers, manufacturers and regulators are greatly concerned about food safety and quality control/management. Changing global pattern of food production; international trade, technological advancement. public awareness and their expectations; health and hygiene; new Food SafetyAct of Government of India and many other related factors have created huge demand for trained personnel in food microbiology, safety and quality control.

B.Sc. (Food Microbiology, Safety and Quality Control) has been designed after carefully going through the requirements of various industries like-Food, soft drink, beverages, and the requirements of Agricultural and Processed Food Products Export Development Authority (APEDA), Ministry of Commerce, Government of India and the newly developed concept of nutritional therapy. This programme is expected to meet the increasing requirements of human resources for food microbiology, safety and quality control/management professionals in agriculture and food sector.

Objectives of the Course:

Main objective of the course is to prepare well qualified professionals for application of microbes in food industry, auditing of Food Safety and Quality control/management system in the country so that India may compete with developed countries in global food safety and quality requirements. It will also ensure consumer safety within and outside the country and will improve public health and reduce medical expenses.

Exit points:

If a candidate leaves the course after one year, he/she shall be awarded UG Certificate in "Food Microbiology & Food Chemistry". If a candidate drops out after completing two years of course, he/she will be awarded an additional "UG Diploma in Food Safety". Full degree of B.Sc. (Food-Microbiology, Safety and Quality Control) shall be awarded only after completion of full three years courses including all practical and compulsory industrial training/project/thesis.

ORDINANCES

All rules for conduct of examination pattern, pass percentage and admissions shall be the same as for other undergraduate three year courses in the Faculty of Science on the University campus. Maximum marks given in the Table are only tentative and each course may be allotted different marks if necessary, as per other professional UG courses of the University. In first three semesters three internal practicals including a group of three papers (A,B,C) will be carried out followed by single external practical per year. An average of the marks obtained in internal and external will be considered as obtained marks out of 150 in each year. In the third year the practical exam will be based on three courses only carried out as internal and external, the average of which will be finally granted to the student in the first half after session followed by a 4-6 months project work. A candidate will have to complete a project in the third year for a period 4 to 6 months. Project/Practical work related to testing of food samplesmay be completed either in the Department of Microbiology and/or in collaboration with other laboratories/industries if the adequate facilities are available there. Course Coordinator may identify and select the laboratories/industries/other institutes and may undergo any M.o.U. if required. One of the supervisors for project work may be opted from outside the University/Institute/laboratory where the candidate shall complete the project work. After the completion of Project work /internship the candidate shall submit a detailed project report/thesis and will make an open presentation for 20-30 minutes. He will defend his/her experimental design, results and conclusions before the Board of Examiners,to be appointed by the competent body/officer of the University who shall be normally the Vice-Chancellor.

Number of seats and fee structure

Initially there should be only 30 seats which may be altered depending upon the facilities available in the Department. Reservation shall apply as per the policy of the University for other coursed on the campus. This course is approved under self finance scheme of the University/State Govt. and annual tuition fee of Rs. 50,000/- (Rs. Fifty thousand only) is suggested which shall include the project fee if any. However, the fee structure may be altered by the University depending upon the resources available.

Eligibility for Admission

Minimum eligibility for admission in this three year B.Sc. (Food-Microbiology, Safety and Quality Control) course shall be 10 + 2 (Biology / Agriculture), with 45% marks for Gen./OBC and 40% marks for SC/ST/PWD (40% disability).

Appointment of Examiners

Course Coordinator is authorized to make a proposal of the examiners (both for theory and practical examination) in consultation with the members of Board of Studies either through telephonic conversation or through electronic media. Alternately, a meeting of Board of Studies may be convened.

COURSE STRUCTURE

Following course structure is approved. The Department shall be at liberty to change/alter the sequence of the courses depending upon the resources available.

S.N.	Code No.	Title of Course	Internal MM	External MM
		First Year		
1.	FM-101	Instrumentation (A)	50	50
2.	FM-102	Microbial Techniques in Food& Water Industry (A)	50	50
3.	FM-103	Microbial Diversity – Prokaryotes (B)	50	50
4.	FM-104	Microbial Diversity – Eukaryotes (B)	50	50
5.	FM-105	Food and Food Sources (C)	50	50
6.	FM-106	Food Microbiology (B)	50	50
7.	FM-107	Food Chemistry (C)	50	50
8.	FM-108	Dairy Technology and Microbiology of Dairy Products(C)	50	50
9.	FM-109	Biostatistics, Computer Applications& Bioinformatics (A)	50	50
10.	FM-110	Practical based on A, B, C (Each Practical is of 50 marks)	---	150
		Second Year		
11.	FM-201	Food Processing, Preservation and Packaging(B)	50	50
12.	FM-202	Food Laws & Standards (A)	50	50
13.	FM-203	Principles of Food Safety (A)	50	50
14.	FM-204	Principles of Food Quality(A)	50	50
15.	FM-205	Fermentation Technology (B)	50	50
16.	FM-206	Water & Food Borne Disease(C)	50	50
17.	FM-207	Public Health Engineering & Hygiene(C)	50	50
18.	FM-208	Microbial Genetics, Molecular Biology &Genetic Engineering (C)	50	50
19.	FM-209	Nutritional Therapy (B)	50	50
20.	FM-210	Practical based on A, B, C (Each Practical is of 50 marks)	---	150

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		Third Year		
21.	FM-301	Environmental Microbiology	50	50
22.	FM-302	Food Quality Management Systems	50	50
23.	FM-303	Food Packaging & Marketing	50	50
24.	FM-304	Practical	---	150
25.	FM-305	Project Report	---	300

NOTE:

1. **Internal Assessment includes Quiz, Seminar /Assignment and Internal test. Each paper have 5 units, each unit have quiz of 3 marks, 2 marks seminar/assignment and 5 mark internal test.**

Quiz	:	5 X 3 = 15
Seminar/Assignment	:	5 X 2 = 10
Internal Test – I	:	2 X 5 =10
Internal Test – II	:	3 X 5 = 15
Total	:	50

2. **In all the papers the student will have to separately secure 40% marks in extend as well as in internal. Total marks will be allotted out of 50 as an average of external and internal.**

3. **A Candidate will have to complete a project/training work in the beginning of third year for a period 4 to 6 months. This will be preceded by study of 3 theory papers and their exam.**

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Code FM-101: INSTRUMENTATION

Unit I- Basic principle and functioning of industrial fermenter, scope, relevance and future of microbial biotechnology to mankind.

Unit II- Basic principles and applications ofUV-VisibleSpectrophotometer. pH meter, Flame photometer, Atomic Absorption Spectrophotometer, Oven, melting point apparatus,

Unit III- Chromatography (paper, thin layer, column, gel filtration, ion exchange, and affinity chromatography), HPLC, FPLC, basic principle and functioning of GC/LC/MS instrument.

Unit IV-Principles and applications of Electrophoresis for Proteins and DNA: Iso-electric focusing and 2-D gel electrophoresis; Autoradiography, X-Ray diffraction: PCR, DNA probes, Centrifugation; Ultra-centifugation, Ultrafiltration, Lyophilization.

Unit V- Basic principles and functioning of LAF (Laminar Air Flow), control of microorganism by physical methods: heat, filtration, and radiation; chemical methods: phenolics, alcohols, halogen, organic compound, aldehydes, and sterilizing gases: evaluation of antimicrobial agents, effectiveness.

Suggested Readings (Latest Editions):

1. Nelson D and Cox MM, Lehninger's Principles of Biochemistry. W.H. Freeman and Company, New York.
2. Wilson K. and Walker J, Principles and Techniques of Biochemistry and Molecular Biology, Cambridge University Press.
3. Voet and Voet, Principles of Biochemistry.
4. Willey J, Sherwood L. and Woolverton C., Prescott's Microbiology, McGraw Hill.
5. Upadhyaya and Nath, Biophysical chemistry, Himalaya pub. House.

Code FM-102: MICROBIAL TECHNIQUES IN FOOD AND WATER INDUSTRY

Unit-I –Types of culture media, simple, complex, synthetic, enriched, selective and differential, pH and buffers, pure culture methods; steak plate, pour plate, and spread plate, maintenance and preservation of microbial cultures.

Unit II- Investigation of food and water borne disease, objective of investigation, personals involved in the investigation, materials and equipments required on field investigation.

Unit III- Direct microscopic examination of food, ,Detection of pathogens in food and their biochemical characterization. Aerobic plate count, ATP bioluminescence, colony forming units Alternative Methods, rapid methods for the detection of specific organisms and toxins

Unit IV- Detection of coli forms and indicator organism, most probable number, confirmed, compieted test and membrane filter techniques for water.

Unit V- Detection of viral pathogen by real time PCR, PCR, Immuno assay, ELISA, and nucleic acid probes method.

Suggested Readings (Latest Editions):

1. Adams Food Microbiology.
2. Prajapati, Fundamentals of Dairy Microbiology.
3. John C, Ayres OM, William ES, Microbiology of Foods. W. H. Freeman and Co.
4. Robinson Dairy Microbiology.
5. Jay JM, Modern Food Microbiology. Van Nostraaand Reinhold Co., New York.
6. Andrew Proctor, Alternatives to conventional food processing, RSC pub.
7. Frazer WC and Westhoff DC, Food Microbiology. Mcgraw Hill, New York.
8. B.D. Singh, Biotechnology, Kalyani Publication

Code FM-103: MICROBIAL DIVERSITY-PROKARYOTES

Unit I: History, Scope and relevance of Microbiology; Current thoughts on microbial evolution including the origin of life; Introduction to microbial biodiversity – distribution, abundance, ecological niche of bacteria and archae.

Unit II: Current status of microbes in the living world, Modern trends in Microbial taxonomy including RNA world; Salient features of bacteria according to the Bergey's Manual of Determinative bacteriology. Morphology and ultra-structure of bacterial cell.

Unit III General characters ofArhaea and Gram Positive and Gram Negative bacteria, Important genera of Gram Positive and Gram Negative bacteria-Physiological and biochemical protocols for their identification, General characters of Cyanobacteria, their classification, ultrastructure and economic importance.

Unit IV: General characters, nomenclature, classification, morphology and ultra-structure of viruses; Capsid and their arrangement; Purification of viruses by adsorption, precipitation, enzymes, serological methods (haeme agglutination and ELISA). Assay of viruses (physical and chemical methods).

Unit V: Bacteriophages: Structure and life cycle patterns of T-even phages: one step growth curve; Bacteriophage typing; Structure of Cyanophages, Mycophages: General characters and structure of viroids, Satellites and prions.

Suggested Readings (Latest Editions):

1. Prakash S. Bisen, Microbes-concepts and applications. Wiley-Blackwell.
2. J.D S.Panwar, Fundamentals of Microbilogy-S.R.S Pub
3. Willey J, Sherwood L. and Woolverton C. Prescott's Microbiology.
4. Bisen, P.S. Microbes in Practices, I K international publication house pvt Ltd.
5. Sharma P.D. Microbilogy, Rastogi publications
6. J.G Black Microbiology, Wiley publication

Code FM-104: MICROBIAL DIVERSITY-EUKARYOTES

Unit I: General characteristics of eukaryotic microbes; Ultrastructure and organization of a typical eukaryotic cell (membrane structure and functions, cytoskeleton, intracellular compartments- nucleus, mitochondria, chloroplast and their genetic organization); Structure and organization of chromatin; cell division.

Unit II: Current status of fungi; organisms studied by mycologists: General characters, somatic structure, asexual and sexual reproduction of microbiologically,Zygomycotina, Ascomycotina, Basidiomycotina and Deuteromycotina.

Unit III: Mycotoxinstheir identification and determination from food samples: Culture of microfungi from different food samples by damp chamber technique and their identification; examination of various solid and soft foods including water samples for fungal contamination by different cultural methods.

Unit IV: General characteristics of algae; Somatic structure, asexual and sexual reproduction of microbiologically important genera of Chlorophyceae, Phaeophyceae, Bacillariophyceae, Rhodophyceae and Dinophyceae. Culture of algal contaminations from various food and water samples; Economic importance of algae.

Unit V: General characteristics of Protozoans; Nematodes:Structure and reproduction of microbiologically important genera of protozoans (*Entamoeba, Trichomonas, Leishmania, Trypanosoma, Plasmodium) and* Nematodes: *Ancylostoma, Ascarislumbricoides, Necator;*Cestodes: *Taeniasolium,* Trematodes: *Fasciola hepatica.*

Suggested Readings (Latest Editions):

1. Chatterjee K.D. Parasitology, Calcutta publication.
2. David Greenwood Medical Microbiology.
3. Willey J, Sherwood L. and Woolverton C. Prescott's Microbiology.
4. J.G. BlackMicrobiology, Wiley publication
5. Lee. R. E. Phycology, Cambridge University Press, Cambridge.
6. Talaro K.P. & Talaro A. Foundations in Microbiology McGraw-Hill College Dimensi.

Code FM-105: FOOD AND FOOD SOURCES

Unit I: Food basics, food groups, food chain, food texture, food intake and its regulation, food and its functions as physiological, body buildings, psychological and social functions, food pattern, food consummation trends, population growth and food production.

Unit II: Food from plant sources, food grains, cereals and cereal products, composition of cereals, processing of cereals, Pulses and their nutritional value, processing of pulses, nuts and oilseeds, processing of oilseeds, other horticulture crops, post harvest processing of food crops.

Unit III: Food from animal sources, meat and meat products, live stocks poultry and meat production, wholesome of meat production, processed meats, egg and egg products, milk and milk products, dairy by products, fish and fishery products.

Unit IV: Organic foods, genetically modified food, energy drinks, stimulating drinks, carbonated non alcoholic beverages/soft drinks, comfort foods, infants foods, nutraceuticals, ayurvedic medicinal foods, food taboos.

Unit V: Food industry, components and characteristics of the food industry, allied industries, international activities of food industry, processing and value addition, food trade, national food processing policy, food safety.

Suggested Readings (Latest Editions):

1. Nelson D and Cox MM., Lehninger's Principles of Biochemistry. W.H. Freeman and Company.
2. Voet D and Voet JG., Principle's of Biochemistry. John Wiley and sons New York.
3. Stryer. L. Biochemistry. W. H. Freeman and Co.
4. Willey J, Sherwood L. and Woolverton C. Prescott's Microbiology.
5. U. Satyanarayan Biochemistry, Elsevier
6. Andrew Proctor Alternatives to conventional food processing, RSC pub.
7. Frazer WC and Westhoff DC. Food Microbiology. Mcgraw Hill, New York.
8. B.D. Singh. Biotechnology, Kalyani Publication.
9. Srilakshmi B Fpod Science, New Age Publication.

Code FM-106: FOOD MICROBIOLOGY

Unit I-Important microbes involved in spoilage of food, meat, poultry, vegetables and dairy products; factors affecting food spoilage, different types of spoilage, food preservation.

Unit II-Bio-deterioration of food items, Bacterial and mycotoxins, Important microbes secreting toxins, chemical nature of important toxins: their role in food poisoning; physiology and mechanism of action, control of toxin contamination.

Unit III- Uses of microbes in meats and poultry products, vegetables *etc*. Use of microbial enzymes in food; low calorie sweetners, Flavour modifiers; Food additives.

Unit IV- Microbiological examination of milk, standard plate count, direct microscopic count and reductase test, composition of milk, sources of contamination of milk, types of microbes in milk, pasteurization of milk, ability of milk to cause disease.

Unit V:Common food borne pathogens, diseasescaused by them and their symptoms, Disease caused by bacteria, molds and yeasts, viral contamination of foods, parasites, Surveillance system for tracking of food borne disease.

Suggested Readings (Latest Editions):

1. Butt, TM, Jackson CW and Magan N. Fungi as Biocontrol agent. CABI Publishing, UK.
2. Adams Food Microbiology.
3. Prajapati Fundamentals of Dairy Microbiology.
4. John C. Ayres OM, William ES. Microbiology of Foods. W. H. Freeman and Co.
5. Andrew Proctor Alternatives to conventional food processing, RSC pub.
6. Frazer WC and Westhoff DC Food Microbiology. Mcgraw Hill, New York.

Code FM-107: FOOD CHEMISTRY

Unit I- Food chemistry, history, water structure and relations in food components. carbohydrates: monosaccharides, oligosaccharides and polysaccharides, starch and cellulose derivatives as food constituents, sugar and related products nutritional value, lipids: components, food lipids and health, antioxidants.

Unit II: proteins structure and functions, enzymes structure and functions, vitamins structure, types and functions, minerals and nutritional aspects, vegetables and fruits, bioavailability of nutrients.

Unit III: Food oxidants, food pigments, natural and synthetic food colours. flavoring agents, sweeteners, emulsifiers and stabilizers, spices and herbs, food preservatives,organic foods, advantages and disadvantages of organic food.food fortification.

Unit IV: Food adulteration, types of adulteration: intentional adulteration, incidental adulteration, Food laws, food standardization and regulation agencies in India, national standards, international standards.

Unit V- Evaluation of food quality, sensory tests, types of tests, objective evaluation and instruments used for texture evaluation.

Suggested Readings (Latest Editions):

1. Voet D and Voet JG. Principle's of Biochemistry. John Wiley and sons New York.
2. Moat AG and Foster J. W. Microbial Physiology. John Wiley and Sons, New York.
3. Willey J, Sherwood L. and Woolverton C. Prescott's Microbiology, McGraw Hil
4. U. Satyanarayan. Biochemistry, Elsevier
5. Robinson Dairy Microbiology.
6. Jay JM Modern Food Microbiology. Van Nostraaand Reinhold Co., New York.
7. Andrew Proctor Alternatives to conventional food processing, RSC pub.
8. Frazer WC and Westhoff DC Food Microbiology. Mcgraw Hill, New York.
9. Srilakshmi B Food Science, New Age Publication.

Code FM-108: DAIRY TECHNOLOGY AND MICROBIOLOGY OF DAIRY PRODUCTS

Unit I- Overview of Dairy industry, Basic functioning of Dairy plant (retention pond-irrigation, retention pond, second – stage lagoon, irrigation, vegetative filter, settling basin, vegetative filter, overland flow, distribution channelized terrace), Dairy industry in India, milk processing.

Unit II- Fermented milk, yeast and lactic fermentation, mold lactic fermentation, natural Fermented Foods micro flora of dairy industry, pro-biotic products, functional food stuffs, industrial production of healthier food stuffs, modification of food tastes and healthier production, microbiological hazards in dairy industry

Unit III- Dairy products types(concentrated and dried milk products), health risk of consuming dairy products, back drop of milk preservation methods, refrigeration, milk production level, breeding of milk animals, hormone use, nutrition, pesticide use.

Unit IV- Microbiology of spoilage of dairy products, types of spoilage microorganism, source of spoilage, factor affecting spoilage, prevention and control measure, method and detection .

Unit V- Significance of milk and dairy products for humans, consumption of milk hygiene, contamination of milk with extraneous matter, starter culture, component of milk food.

Suggested Readings (Latest Editions):

1. Butt, TM, Jackson CW and Magan N, Fungi as Biocontrol agent. CABI Publishing, UK.
2. Adams, Food Microbiology.
3. Prajapati, Fundamentals of Dairy Microbiology.
4. Robinson (Latest Edition). Dairy Microbiology.
5. Jay JM, Modern Food Microbiology. Van Nostraaand Reinhold Co., New York.
6. Andrew Proctor, Alternatives to conventional food processing, RSC pub.
7. Frazer WC and Westhoff DC, Food Microbiology. Mcgraw Hill, New York.
8. B.D. Singh, Biotechnology, Kalyani Publication

Code FM-109: Biostatistics, Computer Applications & Bioinformatics

Unit I: Introduction to Biostatistics: Definition, Types of statistics. Applications and uses of Biostatistics, Identification and types of variable, Tabulation of data. Graphical presentation (categorical and metric data), charting of data using MS-Excel; Sampling techniques; Frequency distribution; Measures of central tendency (mean, median and mode); Measures of dispersion: mean deviation and standard deviation; Correlation and regression.

Unit II: Basic concepts related to probability theory, classical probability. Probability distributions: Introduction and simple properties of Binomial, Poisson, Normal and skewed distribution and their applications in biology. Sampling: Concept of sampling and sampling techniques;

Unit III:Overview of computer systems: Introduction and classification; Components of computer; generation of computers; Number system; Flow chart; Basics for operating system (MS-DOS, WINDOWS, Unix and Linux); Introduction to softwares; MS-Office (MS-WORD, Power Point, MS- Excel).

Unit IV Introduction to networking (LAN, WAN, MAN) servers, application of networking, Topologies (Bus Network, Ring Network, Star Network, Mesh Network, Tree Network) and their advantages & disadvantages; Transmission Medias (Coaxial Cable, Fiber Optics, Twisted Pair); Internet, downloading files with anonymous FTP, Gopher, Mosaic.

Unit V: Introduction to Bioinformatics, Role of Bioinformatics; Biological databases: Nucleic Acid Sequence Database, Protein Sequence Database and Protein Structure Database); obtaining BLAST Documentation and Help; Important bioinformatics websites (NCBI, EBI, SIB).

Suggested Readings (Latest Editions):

1. Guigo R. Ed. &Gusfield. Algorithm in Bioinformatics. O.Ed. Berlin. Springer-Verlog
2. Sharma, Munjal and Shankar. A Text book of bioinformatics. Rastogi Publications
3. P.K. Sinha. 2016. Fundamental of computers. BPB publication.
4. Ewens, W. J. & Grant, G. R. Statistical methods in bioinformatics: an introduction. New York Springer.
5. S.C.Gupta& V.K. Kapoor. Fundamentals of Applied Statistics Sultan Chand publication
6. Ghosh. Subir. Statistical design and analysis of industrial experiments.
7. David W. Mount, David Mount. Bioinformatics: Sequence and Genome Analysis.

Code- FM-201:Food Processing, Preservation and Packaging

Unit I-Introduction to food processing,food container manufacturing. food canning. food science and high processing techniques, shelf life of processed food.food processing of cereals, legumes, oil seeds, fruits and vegetables, dairy products. dairy processing biotechnology, membrane technology in dairy processing and fermentation, flesh food technology, food additives. extruded food. food radiation.

Unit II- Introduction to preservation, types of preservation, natural and artificial preservative agent, class I, II and III preservative agents, methods of preservation. thermal process, Vacuum drying and dehydration, cooking and freezing. food preservation by chemicals, minimal processing of fresh foods,

Unit III- Emerging techniques in food processing, modified atmosphere packaging. genetic engineering.

Unit IV- Emerging technologies for minimally processed fresh fruit juices. pulse electric field, high hydrostatic pressure.

Unit V- Environmental aspects of food processing technology, food packaging wastes and its environmental aspects, environmental impact on packaging. food processing industry, safety in food processing,

Suggested Readings (Latest Editions):

1. J. Scott Smith and Y.H. Hui., Food processing principles and applications. Blackwell publishing
2. B.S. Khatkar, Food Science and technology,Daya publishing house Delhi
3. Martin R Adams and Maurice O Moss Food Microbiology. The Royal Society of Chemistry. Cambridge UK
4. William C frazier, Dennis C Westhoff. Food microbiology. McGraw Hill Education privete Limited New Delhi

Code-FM 202: Food Laws and Standards

Unit I- Introduction to food laws, Prevention of Food Adulteration Act (PFA-1954), the preamble of Act, definition, primary food, kinds of adulteration in the Act, adulterated food, article held as court, misbranded food, functional responsibilities of various authority, central food laboratories, role of food inspectors

Unit II- Food safety and quality requirements, voluntary requirement, legal requirement, mandatory provisions prescribed under PFA Act, 1954 and rules 1955. Enforcement of Prevention of Food Adulteration Act (PFA- 1954) by State Government, Ministries and Departments responsible for ensuring food safety and quality in India

Unit III- Food Safety and Standards Act 2006 (FSSA-2006)- rules and regulations 2011, existing food laws in India, salient features of Food Safety and Standards Act 2006, Important provision of FSSA, Essential Commodities Act.

Unit IV- Codex Alimentarius commission (CAC), Statutes of codex alimantrius commission, needs for harmonizing national standards with codex. WTO implication, SPS agreement, TBT agreement, relation between the codex and WTO. dispute settlement, other international standards setting bodies.

Unit V-Customs Act and Import Control Regulation, other law related to food product (Legal metrology, provisions of Weight and Measure Act 1976.The Insecticides Act 1968, Consumer Protection Act 1986, Customs Act 1962.

Suggested Readings (Latest Editions):

1. Visit http://www.cfst-angrau.co.cc or http://www.cfst-bapatla.blogspot.com for all Act, Order, Rules and other material.
2. Patricia and Curtis A, An operational Text Book, Guide to Food Laws and Regulations.
3. Ranganna S, Hand book of Analysis and Quality Control for Fruit and Vegetable Products
4. Dev Raj, Rakesh Sharma and Joshi V.K, Quality for Value Addition in Food Processing.
5. The Food Safety and Standards act, along with Rules & Regulations. Commercial Law Publishers (India) Pvt. Ltd.

Code-FM 203: Principles of Food Safety

Unit I- Introduction to food safety, hazards to safe food (chemical, biological, physical hazards), contamination and spoilage, food hygiene, food itself, people -- safety of food, facilities and equipment, sources of contamination, primary production contamination, purchase, storage, production for packaging, distribution and delivery and service, food quality, food safety challenges, protection food from contamination (chemical, biological, physical hazards), reducing the effect of contamination; Role of food processing industries and sector.

Unit II- History, back ground and structure of HACCP, Food chain steps, biological hazards, chemical hazards, physical hazards, history of HACCP, benefits and barriers in implementing HACCP, HACCP principles, HACCP prerequisites and good hygiene practice, Environmental hygiene, design and facilities in the establishment, equipment, utilities, control of operation, personal health and hygiene, pest control,

Unit III- Principles and implementation of HACCP- Identification of hazards and control measures, determination of significant hazards, determination of critical control points, establishing the critical limits. Establishment of corrective action, establishment of verification procedure, establish documentation and record keeping, validation, general errors in HACCP plan, Quantitative approach in HACCP , implement of HACCP Plan, case studies of HACCP.

Unit IV- Introduction to risk analysis, risk management, Risk assessment, and Risk communication.

Unit V- Other food safety practices- Good Agriculture practices, good animal husbandry practices, good manufacturing practices, good retail practices, good transport practices, nutritional labeling, Traceability studies,

Suggested Readings (Latest Editions):

1. Adams MR and Moss MO, Food Microbiology RSC publications, UK.
2. Lightfoot NF and Maier EA (Editor), Microbiological analysis of food and water, Elsevier Publication, Netherland.
3. Ray B and Bhunia A, Fundamental food Microbiology CRCpublication, UK
4. B. Srilakshmi, Food Science New Age International Publisher, New Delhi
5. Martin R Adams and M J Robert Nout, Fermentation and Food Safety, Aspen Publication, Maryland.
6. Gilbert J., Food Packaging: Ensuring the safety and quality of Food, Publisher Taylor and Francis, Basingstake, Hants, UK

Code-FM 204: PRINCIPLES OF FOOD QUALITY

UNIT 1: Auditing: Scope of the standard terms & definitions, internal audit, External audit, combined audit, Joint Audit. Principal of auditing, competence and evaluations of auditors, quality management principles. ISO 9001: 2000, quality management system, Clauses of ISO 9001: 2000.

UNIT 2: Standardization and accreditation : Introduction. International accreditation forum (IAF), Internal Laboratory Accreditation Cooperation (ILAC), Quality Council of India (QCI), National Accreditation Board for Testing and Calibration Laboratories (NABL).

UNIT 3: Quality Control & Selection: Introduction, Legislative requirement, FSA surveillance, Laboratory accreditation and quality control, proficiency testing, Analytical methods: codex Alimentarius commission, European Union, other organizations.

UNIT 4: Pesticides: Introduction, monitoring pesticides in food, high risk group, human exposure. Mycotoxins: Introduction, Health implications of mycotoxins application of HACCP system to control mycotoxins, preventions and control of mycotoxins.

UNIT 5: Radiation: Safety of use of irradiated food, preservation of food by radiation, measurement of radiations, specific type of radiations treatment for safety of food, uses of radiations and prevention of food adulteration.

Suggested Readings (Latest Editions):

1. Adams MR and Moss MO, Food Microbiology RSC publications, UK.
2. Lightfoot NF and Maier EA (Editor), Microbiological analysis of food and water, Elsevier Publication, Netherland.
3. Ray B and Bhunia A, Fundamental food Microbiology CRCpublication, UK
4. B. Srilakshmi, Food Science New Age International Publisher, New Delhi
5. Martin R Adams and M J Robert Nout, Fermentation and Food Safety, Aspen Publication, Maryland.
6. Gilbert J., Food Packaging: Ensuring the safety and quality of Food, Publisher Taylor and Francis, Basingstake, Hants, UK

Code-FM 205 FERMENTATION TECHNOLOGY

Unit I Definition and scope of fermentation, basic design and operation of fermenter, microbial growth patterns and kinetics in batch culture, microbial growth parameters. Role of microbes in milk and dairy products.

Unit II General Principles of culture maintenance and preparation, bacterial culture, yeast culture and mold culture, properties of fermented foods, production of starter culture for dairy industries.

Unit III Food fermentation- bread, malt beverages, wines, distilled liquors, vinegar, fermented vegetables, production of cheeses, butter, yoghurt and fermented milk, oriental fermented foods.

Unit IV Food and enzymes from microorganism, microbial biomass: single cell proteins and myco-protein, production of amino acids, and production of other substances added to foods, production of enzymes, fermented by-products

Unit V Benefits of fermentation, microbial activities in fermented food, control of microbial activities in fermented food, shelf life of fermented foods, and market of fermented food.

Suggested Readings (Latest Editions):

1. Cruger, W. and AnneliieseCruger, A., Biotechnoloogy, A text book of industrial Microbiology, Panima Publishers, New Delhi.
2. Casida, L.E., Industrial Microbiology, Willey Eastern Ltd, New Delhi.
3. Stanbury, P.F. and Whitaker, A., Principles of Fermentation Technology, Pergamon Press, Oxford.
4. Okafar, N., Modern Industrial Microbiology and Biotechnology.

CODE FM- 206: WATER AND FOOD BORNE DISEASE

Unit I Classification of food borne diseases, Food poisoning, infection, and intoxication, non bacterial toxins and mycotoxins Sea food toxicants. Poisioninig by chemicals.

Unit II Major food and water borne bacteria *S.aureus, Pseudomonas. Clostridium, Bacillus, Vibrio, E.coli, Salmonella, Shigella,* Major food and water borne Viruses- Polio virus, Rotavirus, SARS, Coronavirus, Enterovirus

Unit III Rapid methods for detecting microbial contaminants in foods. Interpretation and application of result and preventive measure

Unit IV Irradiation replaces other food borne disease, microbiological aspect of food, transmission, symptoms, diagnosis, treatment, prevention of disease. Surveillance system for tracking food borne disease.

Unit V Natural waters: Sources of contamination, Microbial indicators of fecal pollution and other pollution, Elevated temperature test, IMViC test Water quality test.

Suggested Readings (Latest Editions):

1. Marth, E.H. and Steele, J.L. Applied Dairy Microbiology, Marcel Dekker, Inc. New York
2. Frazer, W.C. and Westhoff, D.C.Food Microbiology, McGraw Hill, New York.
3. Willey, J., Sherwood, L. and Woolverton, C. Prescott's Microbiology, McGraw Hill, New York.
4. Murray, P.R., Pfaller, M.A., Tenover, F.C. and Yolken, R.H. Clinical Microbiology. ASM.

Code FM-207: PUBLIC HEALTH ENGINEERING AND HYGIENE

Unit I: Individual health parameters, Determinants of Health, Key health indicators, Burden of diseases, Importance and Source of Public-health Data Health status in India: Standards, Relevance to social aspects, Future challenges in public health.

Unit II: Role of Public, Private and NGO in Health sector, Expenditure in Health-care, Government Plans and Policies in India, The Global Health Council. The International AIDS Vaccine Initiative, Malaria Vaccine Initiative, World Health Organization (WHO).

Unit III: Overview of Healthcare Systems in India. Primary healthcare hand-washing, immunization, circumcision, Secondary healthcare draining puddles of water, clearing bushes and using insecticides, Tertiary healthcare Hospital interventions intravenous rehydration and surgery, Family planning programs: Contraceptives, Sexuality education promotion of safe sex, Pregnancy risk, infant health.

Unit VI: Microbiological analysis of food: Direct Microscopic examination of food, Cultural techniques, Enumeration method: Direct count by SPC (Standard plate count) and MPN (Most probable number) Count Physico-chemical method by Dye reduction test, Electrical methods, ATP determination.

Unit VII: Food Safety Supervisor, Use of gloves, Effective hand washing, Home hygiene, Hygiene in the kitchen, bathroom and toilet, body hygiene, food hygiene, Medical Hygiene at home.

Suggested Readings (Latest Edition):

1. Gordon Edlin'and Eric Golanty Health & Wellness Jones &BarlettPublisher.
2. Skolnik Richard Global Health 101 Jones &Barlett Learning
3. Mary-Jane Schneider Introduction to Public Health Jones &Barlett
4. Geofferey Campbell-Platt Food Science and Technology, Willey andBlackwell Publication, UK.
5. Lightfoot NF and Maier EA Microbiological analysis of food and water.Elsevier Publication, Netherland.

CODE FM 208: MICROBIAL GENETICS AND MOLECULAR BIOLOGY AND GENETIC ENGINEERING

Unit I: Nucleic acids as genetic information carriers: experimental evidences; DNA structure: historical aspects and current aspects, types of DNA, DNA replication in prokaryotes, steps: initiation, elongation, termination, types of polymerases, central dogma.

Unit II: Types and structural features of RNA (mRNA, tRNA, rRNA), transcription in prokaryotes and eukaryotes, genetic code, protein synthesis in prokaryotes and eukaryotes, Regulation of gene expression: operon concept, Lac operon, negative and positive regulation.

Unit III: Gene structure and functions, mutations, spontaneous and induced mutations, mutagens (physical mutagens: non ionizing radiation, chemical mutagens: base analogues, alkylating agents, deaminating agents, intercalating agents and others), DNA repair mechanisms, gene transfer mechanisms, transposable elements.

Unit IV: Basics of r-DNA technology, enzymes used in r-DNA technology: DNA ligase, DNA polymerase, Klenow fragment, reverse transcriptase, exonuclease, endonuclease, terminal deoxynucleotidyltransferase, alkaline phosphatase, polynucleotide kinase, restriction enzymes and their types, gene libraries: genomic library, cDNA library.

Unit V: PCR and its applications, DNA sequencing methods: dideoxy and chemical methods; DNA finger printing, hybridization; general properties; plasmids, bacteriophages, cosmids, shuttle vectors, bacterial artificial chromosomes.

Suggested Readings (Latest Editions):

1. David P Clark, Cell and Molecular Biolgy.
2. J.E. Krebs, Lewin's Genes X, Jones Pub.
3. T.A.Brown, Gene cloning of DNA Analysis. Wiley Blackwell.
4. J D Watson. Molecular biology.
5. Jeff Hardin, Gregory Bertoni, Lewis J. Kleinsmith, Becker's Word of the cell.
6. Gerald Karp, Cell Biology, Wiley Blackwell, Pub.

CODE FM-209: NUTRITIONAL THERAPY

Unit I: Sources of Nutrition, Nutritional requirements of a healthy person. Therapeutic nutrition, Nutritional supplements, artificial nutrition, Enteral Nutrition. Parenteral Nutrition. Functional foods, types of functional foods, Neutraceuticals.

Unit II: Use of Therapeutic nutrition in Nausea, Vomiting. Swallowing problems. Weight loss and related problems, Allergies, Food allergies, Diagnosis and intolerance, Dietary management of food allergies. Pea nut allergy. Cow milk allergy. Digestive disorders and diets.

Unit III: Diabetes, types of diabetes, complications associated with diabetes. Therapeutic nutrition and management of diabetes; dietary fat and cholesterol, Renal/kidney conditions, kidney stones, eating the right amount of energy

Unit IV: Cancer, dietary factors associated with cancer, therapy and nutrition. nutritional side effects and dietary management, metabolic conditions of liver; Hepatitis, Cirrhosis, Gallbladder

Unit V: Food for man: use of microbes and microbial enzymes in the improvement of nutritive quality of food, probiotics and Prebiotics, microbiological criteria for food, Fruit juices, Food control.

Suggested reading (Latest Edition):

1. Adams M. R. & Moss M. O. Food Microbiology, Royal Society of Chemistry Publication, Cambridge.Pergamon Press.
2. Hobbs B. C. & Roberts D. Food poisoning and Food Hygiene, Edward Arnold (A division of Hodder and Stoughton London).
3. Robinson R. K. Dairy Microbiology, Elsevier Applied Sciences. London.
4. Jones, S., Quinn S., Textbook of Functional Medicine.
5. Jonathan V. Wright (latest Edition) Dr Wright's book of nutritional therapy
6. William C Frazier, Food Microbiology, McGraw Hill.

CODEFM 301: ENVIRONMENTAL MICROBIOLOGY

Unit I: Environmental microbiology, historical perspectives, modern environmental microbiology, overall role of microbes in ecosystem, aeromicrobiology and aquatic microbiology, extremophiles.

Unit II: Soil microbiology, microbial diversity in surface soils, microbial decomposition of organic matters, microbial successions within and above the soil, biogeochemical cycles- C, N, S, P, etc.

Unit III: Microbiomics and microbial interactions, microflora of ruminants body, microbes-plant interactions, phyllosphere, rhizosphere, endophytes, mycorrhiza, biopesticides.

Unit IV: Microbial degradation, deterioration and bioremediation (oil spills), xenobiotics, biodegradation of xenobiotics (pesticides, polythenes), biocorrsion of metals, microbe–metal interactions (bioleaching, biomining, biohydrometallurgy), role of biosurfactants.

Unit V: Microbes and water potability- purification of potable water, sanitary analysis of water
(indicator microbes and methods of their detection), standards(tolerable levels) of water quality of faecal contamination, microbes in solid waste and sewage management (small scale and large scale), modern sewage treatment methods – oxidation ponds, trickling filters.

Suggested Readings (Latest Editions):

1. Sharma, P.D. Environmental Microbiology, Rastogi Publications.
2. Prakash S. Bisen, Microbes in practice-I K international publication house pvt ltd.
3. Prakash S. Bisen, Microbes-concepts and applications Willey BlackWell Pub.
4. Forster CF and John DA, Environmental Biotechnology. Ellis Horwood Ltd. Publication.
6. Christon JH A Manual of Environment al Microbiology. ASM Publications.
7. Maier RM, Pepper IL and Gerba C.P., Environmental Microbiology. Academic Press. USA
8. Michel R. Introduction of Environmental Microbiology.

CODE FM 302: FOOD QUALITY MANAGEMENT SYSTEM

Unit I: Introduction to management system, ISO 9000: 2000/2008 quality management system - requirement and structure, ISO 14001: 2000 – Environmental management system requirement, OHSAS 18001:2007 Occupational health and safety management system.

Unit II: Laboratory Quality Management System, Overview and Requirements of ISO 17025. Requirements Specific to Food Testing Laboratories – Physical. Chemical and biological parameters. Good laboratory practices (GLP).

Unit III: Standardization and accreditation- international laboratory accreditation cooperation (ILAC), ISO/TS 22003:2007 Food safety management system requirement for bodies providing audit and certification of food safety management system, ISO Guide 65: general requirement for bodies operating product certification system, ISO/ IEC 17020: 1998.

Unit IV: Food Quality Management, Characteristics of quality, Quality Control. Quality Assurance, Total Quality Management, Quality Management System. Good Manufacturing Practices, Safety management HACCP – HAXOP.

Unit V: Hygiene and Sanitation in Food Service Institutions:Cleaning and disinfection, Personal hygiene, Pest control, Waste disposal, Evaluation of food quality, sensory tests, Types of tests, sensitivity tests, objective evaluation. Instruments used for texture evaluation. General criteria for the operation of various types of bodies performing inspection, ISO/IEC17025: 2005 - General requirement for the competence of the testing and calibration laboratories.

Suggested reading (Latest Edition):

1. Goodburn EU food law, Microbiological testing and food safety management. Vol. 7. Blackwell Academic & Professional, London.
2. Microbiological risk assessment in food processing. Edited by Brown, M. and Stringer. M.Woodhead Publishing Limited.
3. Srilakshmi B. Food Science. Delhi: New Age International Private Limited.
4. Suri S and Malhotra A. Food Science, Nutrition and Safety, Pearson India Ltd
5. Marriott NG and Gravani RB. Principles of Food Sanitation, New York: Springer.
6. Martin R Adams and M J Robert Nout Fermentation and Food Safety, Aspen Publication. Maryland.

CODE FM 303: FOOD PACKAGING AND MARKETING

Unit 1: Introduction, need of food packaging, types of packaging. Forms of packaging.

Unit 2: Packaging material, Flexible packaging material. Rigid packaging material. Semi-rigid packaging material. Modern packaging concept

Unit 3: Modified atmosphere packaging for minimally processed foods. Active and intelligent packaging.

Unit 4: Labelling, Bar coding in packaging, packaging and environment. edible packaging of food, biodegradable plastics.

Unit 5: History of food marketing, marketing mix, segmentation of food marketing. criticism, issues, food safety and public health.

Suggested Readings (latest edition):

1. RaijaAhvenainen, Novel Food Packaging techniques; CRC Publication.
2. Shapiro, Nutrition Labelling Handbook (Food science and Technology); Publisher : CRC
3. Packaging technology educational volumes, (Set –A), Indian Publications.
4. S. Natarajan, M. Govindarajan, B. Kumar. Fundamental of packaging technology.

B.Sc. Microbiology (Affiliated Colleges) — Modified Syllabus

Biophysics B 106

Unit 1: Physics and biology: Properties of open systems, scope and methods of biophysics, radioactivity, biophysical principles (diffusion, surface tension, ultrafiltration, etc.)

Unit 2: Laws of thermodynamics (I & II), comparison of I & II law, concept of energy in biological systems in accordance to thermodynamics, living body as a thermodynamics system, biophysics of water & pH systems, kinetics of simple enzymatic reaction, conformational properties of enzymes, biophysics of enzyme substrate reaction

Unit 3: Light and associated phenomena, stero isomerism, optical isomerism, muta rotation, photo chemical reactions, photosynthesis, chemi osmotic coupling, bacteriorhodopsin, biophysics of vision, hearing, sense of balance and rotation

Unit 4: Biophysics of membrane, electrical properties, membrane potential (neurotransmitter), molecular transport across cell membrane

Unit 5: Biomechanics of striated muscles, cardio vascular system, synapses, signal transduction

30/4/19 30/4/2019 30/4/19 Shalini 30/4/19

To be added with original syllabi

B.Sc MB II Year (TOPICS TO BE ADDED) (Molecular Biology)

Unit III Properties of genetic code , central dogma of life, Wobble Hypothesis,split genes, overlapping genes. C Valve paradox, cryptic genes, psuedogenes

Unit IV RNA Processing, post translational modification of proteins, m RNA Degradation, and protein degradation control

30/04/19 30/4/2019 30/4/19

Shalini 30/4/19

CH. CHARAN SINGH UNIVERSITY, MEERUT

Ref.: Committee Cell (BOS-Micro.)/3985
Dated: 29-04-2019

A meeting of the Board of Studies (University Campus & Affiliated Colleges) in the subject of Microbiology will be held on 30-04-2019 at 2.00 P.M. in the Committee Room Administrative Block, Choudhary Charan Singh University, Meerut. Members are requested to kindly find it convenient to attend the meeting please. Agenda of the meeting will be placed on table.

Members of Board of Studies in Microbiology :-

1. Prof. Y. Vimala, Department of Botany, C.C.S. University, Meerut.
2. Prof. V.P. Singh, ~~Head~~ Retd. Former Head Department of Botany University of Delhi. 110007
3. Prof. Navneet, Department of Botany & Microbiology, Gurukul Kangri Vishvavidyalaya, Haridwar (U.K.)
4. Prof. S. K. Bhatnagar, Retd, Dept. of Biotechnology, College of Basic Science, S.V. B.P.U.A & T. University, Meerut.

Seen
29/4/19

Registrar

Copy to:-

1. S.V.C. for kind information of the Hon'ble Vice Chancellor.
2. P.A. to Pro. V.C. for kind information of the Pro. V.C.
3. Steno to the Finance Controller for information of the Finance Controller to make arrangement of payment of TA/DA of participant and to expedite the bills of refreshment will be submitted by the concerned.
4. H.O.D. concerned/committee cell to make arrangement of refreshment e.t.c. to the members.

Registrar

Original Syllabus

Unit-III Inorganic nitrogen assimilation. Role of microbes in nitrogen cycle in nature,Nitrifaction and denitrifaction.

Unit-IV Nitrogen fixation,Nitrogenase and modern aspect of biological nitrogen fixation by autotrophic and heterotrophic bacteria.

Unit-IV Secondary metabolites- a general account.

COURSE VII: MOLECULAR BIOLOGY AND MICROBIAL GENETICS

PAPER I. MOLECULAR BIOLOGY (B-205)

Unit-I Molecular basis of life. Structure of DNA, DNA replication in both prokaryotes and eukaryotes, DNA recombination:molecular mechanism.Genetic basis of transformation,transduction and Conjugation.

Unit-II Organization of genetic material transposons.

Unit-III Genetic code properties og genetic code condons,wobble hypothesis.

Unit-IV Structure of prokaryotic genes: Transcription,Translation comparison with eukaryotes.

Unit-V Prokaryotic gene regulation: Operon for regulation of lac genes: positive control of the lac operon: molecular details of lac operon.

Paper-II: MICROBIAL GENETICS (B-206)

Unit-I Basic laws of Inheritance (Mendel'slaws), Lethality and interaction of genes. Multiple alleles and isoalleles.

Unit-II Linkage and crossing over,Mapping of genes (with special reference to Prokaryotes), interference,coincidence in prokaryotes and eukaryotes.

Unit-III Concept of gene,classical and Modern gene concepts, Intragenic crossing over and complementation (Cistron.Recon and Muton) Benzer's work on r II locus in T4 phage.

Unit-IV Mutation spontaneous and indeed: chemical and physical mutagens, indeed mutations in plants, animals and microbes for economic benefit of man: DNA damage and repair.

Unit-V Extrachromosomal inheritance: Cytoplasmic inheritance mitochondrial and chloroplast genetic system.

COURSE-VIII: BIOMATHEMATICS, FUNDAMENTALS OF COMPUTER AND BIOSTATICS

PAPER-I: BIOMATHEMATICS (B-207)

Unit-I Matrices: Determination, Properties of determinants solution of simultaneous equation by cramer's rule Matrices Properties of Matrices, Linear independence, Rank of matrices, consistency of equations. Characterstic equation, cayley-Hamilton Theroem, Eigen value and eigen vectors.

30/4/19 30/4/2019

पृष्ठ-1

UTTAR PRADESH
State Medical Faculty

Admission Fees

Admission fees for all Nursing and Paramedical Courses

Sr. No.	Course Name	Government Sector	Private Sector	
		Yearly Fee	Admission Fee (One Time)	Monthly / Yearly Fee
1	Diploma in General Nursing & Midwifery		Rs.4500	Rs.4500 (Per Month)
2	Auxiliary Nurse & Midwife / Health Worker (Female)		Rs.3000	Rs.3000 (Per Month)
3	Certificate in Baby Nursing & Child Care			Rs.5000 (for complete course)
4	Diploma in Lab Technician	Rs.18,000		Rs.1875 (per month) [SMF Quota] Rs.5000 (per month) [Mgmt. Quota]
5	Diploma in X-Ray Technician	Rs.18,000		Rs.1875 (per month) [SMF Quota] Rs.5000 (per month) [Mgmt.

पृष्ठ-2

			Quota]
6	Diploma in Radiotherapy Technician	Rs.18,000	Rs.1500 (per month)
7	Diploma in Pharmacy	Rs.18,000	Rs.3750 (per month) [SMF Quota] Rs.5000 (per month) [Mgmt. Quota]
8	Diploma in Optometry		Rs.4500 (Per Month)
9	Diploma in Orthoptics		Rs.4500 (Per Month)
10	Diploma in Physiotherapy		Rs.4500 (Per Month)
11	Diploma in O.T. Technician		Rs.4500 (Per Month)
12	Diploma in Occupational Therapy		Rs.4500 (Per Month)
13	Diploma in Cardiology Technician		Rs.4500 (Per Month)
14	Diploma in C.T. Scan Technician		Rs.4500 (Per Month)
15	Diploma in Dialysis Technician		Rs.4500 (Per Month)
16	Diploma in Emergency & Trauma Care Technician		Rs.4500 (Per Month)
17	Diploma in Sanitation		Rs.4500 (Per Month)
18	Diploma in M.R.I. Technician		Rs.4500 (Per Month)

	Diploma in C.S.S.D. Technician	Rs.4500 (Per Month)
20	Diploma in Blood Transfusion Technician	Rs.4500 (Per Month)
21	Certificate in Emergency & Trauma Care Assistant	Rs.4500 (Per Month)
22	Paramedical Degree Courses [in any Stream]	Rs.6000 (Per Month)
23	Paramedical P.G. Courses [in any Stream]	Rs.9000 (Per Month)
24	B.Sc. Nursing	Rs.6000 (Per Month)
25	M.Sc. Nursing	Rs.9000 (Per Month)

Quick Links

- Admission Information
- Attendance Login Panel
- Center Login Panel
- Results
- Registration
- Recognized Institutes
- New College Opening / Seat Enhancement

Ordinance & Syllabus
For
B.Sc. in Optometry
academic programme

Duration :

3 years

&

6 months internship

Bachelor of Science in Optometry
(B.Sc. - Optometry)

ORDINANCE

Chapter
"A"

1. B.Sc. - Optometry degree will be under the faculty of Medicine of C.S.J.M. Univers Kanpur.

2. Duration of Course :
   - B.Sc. in Optometry course will be a full time course.
   - Duration will be three years followed by compulsory 6 months internship.
   - This course shall be divided into three professional examinations namely B.Sc. Optometry (B.Sc.- Optometry) Part-I at the end of first academic year, B.S Optometry Part-II at the end of second academic year and B.Sc.- Optometry Part- at the end of third academic year.

3. **No. of Seats :**
   Total no. of Students to this course **shall be 60.**

4. **Admission.**

   Eligibility Criteria:
   For admission in this course candidate has to pass 10 + 2 or its equivalent examination i Science (Biology) conducted by any Board or University incorporated by law or recognized by this University with minimum 50% marks in aggregate in Physics Chemistry & Biology (relaxation of 5% marks for SC/ST student).

   Mode of Admission :
   The candidates for admission to this course shall be selected through an entrance tes conducted by the University/ procedure decided by the governing body of the institute o on the basis of merit of marks obtained (Physics, Chemistry & Biology) in 10 + 2 or it equivalent examination.

5. **Medium of Instruction :**
   English shall be the medium of instruction in the class and in the University examination

6. **Method of Teaching :**
   The method of teaching adopted shall be a combination of lectures, demonstrations an practicals by the full time faculty, visiting or part time or guest faculty.

7. Examination :

There shall be an annual University examination at the end of each academic ye form of theory papers examination and practical examinations. The candidate required to appear in every subject as specified in the course structure for each ye

Duration of Examination :

Each theory paper examination shall be of three hours duration.

Examiners :

The board of examiners for theory papers examination shall consist of 50% inter 50% external examiners and for practical examination there should be one examiner and one internal examiner (of the institute). All examiners shall be dec honorable Vice Chancellor of the University.

Evaluation :

The answer books of the annual University examination shall be evaluated as University rules.

8. Attendance to appear in the annual University examination :

The permission to appear in annual examination shall be granted to such candida who have fulfill the condition of 75% attendance in each subject separately in the practical as per the University rule.

Regarding attendance requirements students will have to fulfill the condition c attendance. 15% relaxation in attendance, in exceptional circumstances can be m the Vice Chancellor on recommendation of the head of the institute/department.

"B"

Regulations : Scheme of Examination

B.Sc. in Optometry Part-I (First Year) University Examination

S. No.	Subjects	Subject code	THEORY MARKS				PRACTICAL MAR		
			Theory Paper	Internal Assessment	Total	Minimum marks	Practical	Internal Assessment	Total
1	General Anatomy & Ocular Anatomy	BOPT-101	80	20	100	50	80	20	100
2	General Physiology & Ocular Physiology	BOPT-102	80	20	100	50	80	20	100
3	General Biochemistry & Ocular Biochemistry	BOPT-103	80	20	100	50	80	20	100
4	Physical Optics	BOPT-104	80	20	100	50	80	20	100
5	Geometric Optics	BOPT-105	80	20	100	50	80	20	100

B.Sc. in Optometry Part-II (Second Year) University Examination

S. No.	Subjects	Subject code	THEORY MARKS				PRACTICAL MA		
			Theory Paper	Internal Assessment	Total	Minimum marks	Practical	Internal Assessment	Tota
1	Optometric Optics	BOPT-201	80	20	100	50	80	20	10
2	Visual Optics	BOPT-202	80	20	100	50	80	20	10
3	Optometric instruments & clinical examination of visual system	BOPT-203	80	20	100	50	80	20	100
4	General Pathology & General Microbiology	BOPT-204	80	20	100	50	80	20	100
5	Biostatistics, Epidemiology & Occupational Optometry	BOPT-205	80	20	100	50	—	—	—
6	General Pharmacology & Ocular Pharmacology	BOPT-206	80	20	100	50	—	—	—
7	Clinical work	BOPT-207	—	—	—	—	—	—	100

B.Sc. in Optometry Part-III (Third Year) University Examination

S. No.	Subjects	Subject code	THEORY MARKS				PRACTICAL MARK		
			Theory Paper	Internal Assessment	Total	Minimum marks	Practical	Internal Assessment	Total
1	Squint & Binocular Vision	BOPT-301	80	20	100	50	80	20	100
2	Contact Lens	BOPT-302	80	20	100	50	80	20	100
3	Ocular diseases	BOPT-303	80	20	100	50	80	20	100
4	Low vision aids	BOPT-304	80	20	100	50	80	20	100
5	Geriatric & Pediatric Optometry	BOPT-305	80	20	100	50	80	20	100
6	Clinical work	BOPT-306	—	—	—	—	—	—	100

Ge

Internal Assessment

- It will be for theory and practical both.
- It will be done through the whole year.
- Candidate must obtain at least 35% marks in theory and practicals separately in in assessment to be eligible for the annual university examination.
- Internal assessment (Theory) will be done as follows :

a) Mid-term and term examinations = 10 marks
b) Assignments/Projects/Class test/Clinical Presentations = 05 marks
c) Attendance = 05 marks
Total = 20 marks

Internal assessment (Practical) will be done as follows :

a) Laboratory manual = 10 marks
b) Day to day performance = 05 marks
c) Attendance = 05 marks
Total = 20 marks

Internal assessment of subjects without practicals will be done as :

a) Mid Term and term examinations = 10 marks
b) Assignments/ Projects/ class test/ Clinical Presentations = 05 marks
c) Attendance = 05 marks
Total = 20 marks

Criteria for Passing

- A candidate is declared to have passed University examination in a subject, secures 50% of the marks in theory and 50% in practicals separately. For comp 50% marks in theory, the marks scored in the internal assessment (theory) shall to the University conducted written examination and for passing in practical scored in University conducted practical examination and internal assessment (shall be added together.

Grace Marks:

- If a candidate fails in one subject (theory only) in the annual University examina grace marks will be given to the candidate by the University before the decla result.
- Candidate failing in practical examination will be considered as failed.

Supplementary Examination:

- A candidate failing in a subject but securing at least 30% aggregate marks required to appear in the university examination after 3 months in that subject/ while attending classes of next year. Those who secure less than 30% aggrega will be required to appear in all the subjects.
- If the candidate fails in supplementary examination his/her session will be shifte year. The candidate will have to take admission in the previous year and pay th fee for the academic year. He/she will have to appear in all the subjects examination.
- Supplementary examination will be held not earlier than 3 months and later than 6 from the date of annual University examination.

Division:

- Candidate will be awarded division at the end of 3rd academic year as follows:
  - Distinction - 75% and above marks in any subject.
  - First division - 60% and above in the aggregate of marks of all subjects
  - Second division- 50% or more but less than 60% in the aggregate of mark subjects.

Internship :

- A candidate will have to undergo internship for a period of six calendar mont medical college/hospital having well equipped Ophthalmology department wi patient & in patient services; which fulfill the norms decided for the university

Degree:

- The degree of B.Sc. in Optometry (B.Sc.- Optometry) course of the University sl conferred on the candidates who have pursued the prescribed course of study for n than three academic years and have passed examinations as prescribed under the re scheme and completed 6 months of compulsory internship.

"C"

Fee Structure

Tuition Fee : As decided by the University / UP Government /Governing body of the Institute.

Examination fee, Enrollment Fee, Application Form Processing ~~Fee & Games Fee~~ : per the other ~~Paramedical Courses~~ of the University.

Security Deposit/ Caution Money (Refundable after completion of the course) decided by Governing body of the Institute.

Bachelor of Science in Optometry
(B.Sc. - Optometry)
Syllabus

Course of Study

B.Sc. in Optometry Part-I (First Year)

Sl.	Subjects	Subject Code	Teaching hour Theory	Teaching hour Practical
1.	General Anatomy & Ocular Anatomy	BOPT-101	80 (50)	50 (30)
2.	General Physiology & Ocular Physiology	BOPT-102	70 (45)	50 (30)
3.	General Biochemistry & Ocular Biochemistry	BOPT-103	80 (50)	50 (30)
4.	Physical Optics	BOPT-104	60	60
5.	Geometric Optics	BOPT-105	60	60
6.	Computer *	—	30	30
7.	English*	—	40	—

*Not included for University Examination

B.Sc. in Optometry Part-II (Second Year)

Sl.	Subjects	Subject Code	Teaching hours Theory	Teaching hours Practical
1.	Optometric Optics	BOPT-201	60	60
2.	Visual Optics	BOPT-202	60	70
3.	Optometric instruments & clinical examination of visual system	BOPT-203	60	70
4.	General Pathology & General Microbiology	BOPT-204	70 (35)	60 (30)
5	Biostatistics, Epidemiology & Occupational Optometry	BOPT-205	70 (35)	—
6.	General Pharmacology & Ocular Pharmacology	BOPT-206	60 (35)	—
7.	Clinical work	BOPT-207	—	80

B.Sc. in Optometry Part-III (Third Year)

Sl.	Subjects	Subject Code	Teaching hours Theory	Teaching hours Practical
1.	Squint & Binocular Vision	BOPT-301	50	60
2.	Contact Lens	BOPT-302	50	70
3.	Ocular diseases	BOPT-303	80	60
4.	Low vision aids	BOPT-304	50	50
5.	Geriatric & Pediatric Optometry	BOPT-305	50	50
6.	Clinical work	BOPT-306*	—	80

Internship

- There shall be six months of Internship after the final year examination for c declared to have passed the examination in all the subjects.
- During the internship candidate shall have to work full time average 7 hours per d working day) for 6 Calendar months.
- Each candidate is allowed maximum of 6 holidays during entire Internship Progra case of any exigencies during which the candidate remains absent for a period mo days, he/she will have to work for the extra days during which the candidate has r absent.
- The Internship should cover all the services provided by Ophthalmology depart medical college/hospital eg. OPD, IPD, OT & community services. Based on the att and work done during posting the Director/Principal/ head of institution/departme issue 'Certificate of Satisfactory Completion' of training following which the U shall award the B.Sc. in Optometry Degree or declare the candidate eligible for the sa
- No candidate shall be awarded degree without successfully completing six internship.
- Institution shall have to satisfy themselves that satisfactory infrastructure facil ophthalmology department exist in the Institute / Hospital where the internship trainin be undertaken. Following parameters / guidelines have been suggested:
  a. It is mandatory for the Institution to have its own well equipped and ophthalmology department.
  b. Senior ophthalmologist should manage the ophthalmology dept. in the Institutes/Ho
- Institute's Director / Principal can at his discretion grant NOC to the students to Internship at the place of his choice provided the concerned Hospital fully satisfies the criteria. For the purpose of granting NOC the candidate shall have to submit to the Ins the status of ophthalmology services available at the place where he intends to Internship.

B.Sc. in Optometry First Year

General Anatomy & Ocular Anatomy

Subject code - BOPT - 101

Min. Hrs. - Theory: 80 Hrs. & Practical: 50 Hrs.

THEORY

1. **Introduction :**
   Anatomy and its sub - division, planes of the body, terms in relation of structures, Regional Anatomy, organ system.
2. **Tissues of the body (Histology of the body tissues) :**
   - Epithelium
   - Connective tissue
   - Bone and cartilage
   - Muscles: Skeletal, Smooth & heart muscle,
   - Blood vessels
   - Neuron, Neuroglia
   - Glands: Exocrine and Endocrine
   - Skin and appendages
   - Lymphoid Tissues
3. **Organ Systems: (General plan) :**
   - Locomotor system: Bones, muscles, joints.
   - Cardiovascular systems: Heart, Regional blood vessels – arteries, veins
   - Lymphatic system including immuno system
   - Digestive system
   - Respiratory system
   - Reproductory system
   - Endocrine system
4. **Anatomy of Central Nervous System :**
   - Central nervous system spinal and brain stem, cerebellum, cerebrum
5. **Ocular Anatomy :**
   - Eye – Sclera, cornea, choroid, ciliary body, iris, retina
   - Refractory media - Aqueous humor, anterior chamber, posterior chamber Lens, vitreous body
   - Eyelids, conjunctiva
6. Development of Eye and Adenexa

PRACTICAL

1. Identification and description of all anatomical structures.
2. The learning of Anatomy is by demonstration only through dissected parts, slides models, charts etc.
3. Practical Demonstration of Orbital structure.
4. Practical Dissection of bull's eye.
5. Demonstration of skeleton - articulated and disarticulated.

General Physiology & Ocular Physiology

Subject code - BOPT - 102

Min. Hrs. - Theory: 70 Hrs. & Practical: 50 Hrs.

THEORY

1. General Physiology :
   - Cell structure and organization
   - Gene action
   - Tissue organization
   - Epithelium
   - Connective tissue - Collagen fibers, elastic fibers, areolar fibers, cartilage, bon
   - Contractive tissue - striated - skeletal - cardiac - non striated - plain myoepithe
   - General principles of cell physiology
   - Electrophysiology of cells
   - Physiology of skeletal muscles
2. Physiology of Blood :
   - Composition
   - Volume measurement and variations
   - Plasma proteins - classification and functions
   - Red blood cells - development, morphology and measurement , functions and dysfunctions
   - White blood cells - development ,classifications, morphology, functions and dysfunctions
   - Platelets - morphology, development, functions and dysfunctions
   - Clotting factors - mechanism , anticoagulants, dysfunctions.
   - Blood grouping - classifications, importance in transfusion, Rh factor and incompatibility
   - Suspension stability
   - Osmotic fragility
   - Reticulo endothelial system:- Spleen, lymphatic tissue, Thymus, Bone marrow
   - Immune system - Cellular, Humoral, autoimmune
3. Physiology of various systems:
   - General arrangement
   - Salivary digestion - functions and regulations
   - Gastric digestion - functions and regulations
   - Pancreatic digestion - functions and regulations
   - Intestinal digestion - functions and regulations
   - Liver and Bile
   - Absorption
   - Motility
   - Body fluids – distribution, measurement and exchange.
   - Kidney – structure of nephron - mechanism of urine formation
   - Urinary bladder and micturition
   - Endocrine system: Hormone mechanism - negative feedbacks, tropic a Permissive action – cellular actions, hypothalamic regulation

Pituitary	-	Hormones, actions, regulations
Thyroid	-	Hormones, actions, regulations
Adrenal cortex	-	Hormones, actions, regulations
Adrenal medulla	-	Hormones, actions, regulations
Parathyroid	-	Hormones, actions, regulations

Islets of pancreas - Hormones, actions, regulations

- Reproduction:- Male reproductive system - control and regulation, semer Female Reproductive system:- Uterus, ovaries, menstrual cycle regulation, and delivery , family planning
- Respiration Mechanics of respiration:- pulmonary function tests, Tra respiratory gases, neural and chemical regulation of respiration, hypoxia, dyspnoea , asphyxia
- Circulation:- General principles, Heart: myocardium, innervations, transm cardiac impulse, events during cardiac cycle, cardiac output

4. **Physiology of Nervous system :**
   - Neuron – conduction of impulse, synapse, receptor. Sensory organization – and perception, Reflexes, cerebral cortex – functions, Thalamus – basal gangl
   - Cerebellum
   - Hypothalamus
   - Special senses (elementary)
5. **Ocular Physiology :**
   - Protective mechanisms in the eye. Eyelid and lacrimation, description of the g
   - Extrinsic ocular muscles, their action and control of their movements
   - Coats of the eyeball
   - Cornea
   - Aqueous humour and vitreous
   - Intra ocular pressure
   - Iris and pupil
   - Crystalline lens and accommodation – presbyopia
   - Retina structure & function
   - Vision – general aspects of sensation
   - Pigments of the eye and photo chemistry
   - The visual stimulus, refractive errors
   - Visual acuity
   - Visual perception-binocular vision, stereoscopic vision, optical illusion
   - Visual pathway, central & cerebral connections, lesions of pathways & effects
   - Colour vision and colour vision defects

PRACTICAL

1. Component & setting of the compound microscope
2. focusing of object
3. Use of Low & High Power objective of microscope
4. Measurement of pulse, blood pressure
5. Elicitation of Reflexes & jerks
6. Identifications of blood cell by study of peripheral blood smears

General Biochemistry & Ocular Biochemistry

Subject code - BOPT - 103

Min. Hrs. - Theory: 80 Hrs. & Practical: 50 Hrs.

THEORY

1. Basics of energy metabolism, nutrition & dietetics :
   Unit of measuring energy, calorific value of food, BMR & factors affecting it, SDA food, calculation of energy requirement, balanced diet, nutrition in health & diseases (protein energy malnutrition).

2. Chemistry of carbohydrates & their related metabolsim :
Introduction, definition, classification, biomedical importance
Brief outline of meatbolism .
Glycogenesis & glycogenolysis (in brief), Glycolysis, citric acid cycle & its signif
HMP shunt & Gluconeogenesis (in brief), regulation of blood glucose level.
3. Amino acids :
Definition, classification, essential & non essential amino acids.
4. **Chemistry of Proteins & their related metabolism :**
Introduction, definition, classification, biomedical importance
Metabolism :
Transformation, Decarboxylation, Ammonia formation & transport, Urea cycle.
5. **Chemistry of Lipids & their related metabolism :**
Introduction, definition, classification, biomedical importance, essential fatty acids
Brief out line of metabolism :
Beta oxidation of fatty acids, Ketosis, Cholesterol & it's clinical significance,
Lipoproteins in the blood composition & their functions in brief, Atherosclerosis.
6. **Enzymes :**
Introduction, definition, classification, coenzymes, isoenzymes, properties, factors affecting enzyme action, enzyme inhibition, diagnostic value of serum enzymes - Creatinine kinase, Alkaline phosphatase, Acid phosphatase, LDH, SGOT, SGPT, Amylase, Lipase, Carbonic anhydrase etc.
7. **Acid base balance concepts & disorders:**
pH, Buffers, Acidosis, Alkalosis
8. **Vitamins :**
Water & fat soluble vitamins, sources, requirement, deficiency disorders & biochem functions & deficiency disorders
9. **Hyperglycemia & hypoglycemia :**
Diabetes mellitus - definition, types, features, gestation diabetes mellitus , glucose tolerance test, glycosuria
Hypoglycemia & its causes
10. **Minerals :**
General functions and sources, Macro and micro minerals associated with the eye, Deficiencies and excess ophthalmic complications, Example: iron, calcium, iodine e
11. **Free radicals :**
Biological reactions , oxidants, antioxidants, diseases, Therapeutic uses of antioxida
12. **Biochemistry of anterior segment of eye :**
- Importance of ocular biochemistry in clinical optometric practice.
- Tear film:- composition, lipid layer, aqueous layer, mucoid layer, func dysfunctions, diagnostic tests, tear substitutes, recent development.
- Cornea – biochemical composition of epithelium, bowman's layer, stroma, desc layer, endothelium – functions, corneal metabolism, nutrient uptake e transparency, barrier mechanism, pump action, irrigating solutions, aging and anomalies, recent developments.
- Lens – composition, metabolism, glucose utilization, sorbitol pathways, glutat and ascorbic acid transport, transparency, cataract formation, aging, photooxid sugar cataract, cataract and ascorbic acid medical therapy – recent developments.
- Aqueous humour –composition – function –ciliary body – aqueous hu production – IOP- Glaucoma

13. Biochemistry of posterior segment of eye :
- Vitreous humour:– structure, composition, functions, vitreous biochemical pa intraocular gels, recent developments.
- Retina – Pigment epithelium structure, composition, photoreceptor cells – rh lipids renewal, inner segment
- Pigment epithelium – choroid, metabolism and function, phagocytosis, vit retinal function and metabolism.
- Retinal neurochemistry: Monoamines – acetyl choline – gaba – amino acids – neuropeptides, Biochemical correlates of retinal diseases.

PRACTICAL

1. Identification of carbohydrates (Qualitative Tests)
2. Identification of proteins (Qualitative Tests)
3. Estimation of glucose in urine by Benedict's methods
4. Urine analysis - normal & abnormal constituents of urine.
5. Blood glucose estimation.
6. Instruments used in clinical biochemistry lab, their care & maintenance.

Physical Optics

Subject code - BOPT - 104

Min. Hrs. - Theory: 60 Hrs. & Practical: 60 Hrs.

THEORY

1. Nature of light:
   - Wave nature of Light - Short coming of wave theory
   - Quantum Theory - Dual nature of Light
   - Mathematical Representation of Wave – S.H.M. - energy composition of S.H.M straight line and right angles
   - Huge's principle - Laws of reflection and refraction at spherical surfaces and len
   - Description of the phenomena of interference, Young's experiment, coherent so phase and path difference, intensity, Theory of interference fringes.
   - Interference in thin films - Interference due to reflected and transmitted light – I single mirror
   - Colours of thin films - wedge shaped thin films – testing of planeness of surface
   - Newton's rings experiment - refractive index of liquid
   - Non-reflecting films
   - Visibility of fringes - contrast and contrast threshold.
2. Radiometry & Photometry:
   - Radiant intensity
   - Irradiance
   - Lamberts cosine Law
   - Basic concepts and definitions in Photometry
   - Reflection co-efficient, transmission co-efficient, power-transmitted and reflecte
   - Lummen Brodhun Photometer
3. Diffraction and scattering:
   - Single slit, qualitative and quantitative
   - Circular aperture
   - Double slit pattern and Kirchoff's integra
   - Multiple slits - grating
   - Reflection grating and the zone plate

- Rayleigh's scattering
- Raman scattering

4. Polarisation :
   - Polarisation of transverse waves - light as transverse waves.
   - Double refraction, principal plane, nicol prism - plane polarization.
   - Circular elliptic polarization production, detection and behavior.
   - Optical activity - Fresnal's half shade polarimeter.
   - Polarisation by selective absorption – dichorism.
5. Spectrum :
   - Sources of spectrum. Bunsen - carbon - mercury - sodium.
   - Emission and absorption spectra -classification, visible, ultra violet and infra s electromagnetic spectrum.

PRACTICAL

1. Refractive index of prism for sodium D-Line using spectrometer.
2. Dispersive power of prism for Hg source using spectrometer.
3. Air wedge - Interference method to find diameter of an optically thin wire.
4. Newton's ring - to find of λ sodium light.
5. Biprism - To find λ of sodium light.
6. Diffraction grating - (Minimum deviation method). of Hg prominent lines.
7. Polarimeter - specific rotation of dextrose and concentration of IV injection.
8. Lummen brodem Photometer - Comparison of luminous power.
9. μ of liquid - using liquid prism - spectrometer.
10. Michelson interferometer -wavelength of laser light.

Geometric Optics

Subject code - BOPT - 105

Min. Hrs. - Theory: 60 Hrs. & Practical: 60 Hrs.

THEORY

1. Properties of Light, Refraction through spherical surfaces :
   - Rectilinear propagation, reflection, refraction, ray, beam.
   - Umbra, penumbra, pinhole camera.
   - Introduction: Lens shapes, Vergences and conversion factors, divergenc convergence of wave fronts by spherical surfaces, definition of dioptre, Work spherical lenses, primary and secondary focal points, predictable rays.
   - Prism diopter, Prentice's Law, deviations, Opthalmic prisms - thin and thick.
   - Spherical refracting interfaces - convex, concave, derivation of vergence equ saggitas, dioptric power - focal points, nodal points and plane. Symmetry p imaging examples, lateral magnification.
   - Thin lens equation - lenses in contact separated. Two lens systems, reduced sy vergence effectively equation.
   - Application - calculation of image points. dioptric powers in reduced systems vergence techniques.

- Thick lenses - front and back vertex powers, reduced system, dioptric equivalent lenses, cardinal points. Application - to calculate to the equivale power of thick meniscus lens, plano convex vertex powers, position of planes. Dioptric powers using reduced systems. Matrix theory and lens matri
- Cylindrical and spherocylindrical lenses: principle meridians, refracti cylindrical lens, calculation of power in different meridians, spherocylindric circle of least confusion, interval of sturm, refraction through a sphero c lens, writing Rx in different forms (+cyl., meridional), additional sphero- oblique- cylinders.

2. **Stops and Pupils:**
   - Aperture stop.
   - Entrance pupil and exit pupil.
   - Field stop.
   - Entrance port and exit port, field of view, vignetting.
   - Depth of field and depth of focus.
3. **Aberrations & Optical System:**
   - Dispersion by a prism - angular dispersion, dispersive power, Dispersion deviation and deviation without dispersion, Achromatic prisms.
   - Chromatic aberrations - cause and methods of minimizing, achromatic doublet
   - Monochromatic aberrations - first order and third order theory.
   - Spherical aberrations, coma, astigmatism, curvature, distortion - cause methods of minimizing aberrations.
   - Tangent condition for elimination of distortion.
   - Point spread function.
   - Modulation transfer function.
   - Fourier imaging theory.
4. **Optical Instruments:**
   - Spectrometer.
   - Simple and compound microscope.
   - Telescope.
   - Magnifying power of simple and compound microscope, telescope .
   - Resolving power of optical instrument.
   - Resolving power of the eye.
   - Fiber Optics.
   - Laser Optics: Basic laser principles - spontaneous and stimulated em Coherence - spatial, temporal, Laser pumping - population inversion optical fee Gas lasers, and solid lasers, Helium neon laser – argon – ion laser – ruby Monocular laser – carbandioixide, eximer laser. Semi conductor lasers. Las medicine ophthalmic applications.

   ~~Lens shapes, vergences and conversion, fenters, divergence and convergence of fronts by spherical lens.~~
5. **Principles of Lighting :**
   - Modern theory on light & colour: synthesis of light.
   - Additive and subtractive synthesis of colour.
   - Visual task: Factors affecting visual tasks
   - Light & Vision: Discomfort glare, Visual acuity, relationship among L visibility and task performance.

- Light sources: Modern light sources, spectral energy distribution, luminous colour temperature, colour rendering.
- Illumination: Luminous flux, candela, solid angle, illumination, Utilizat depreciation factor, illumination laws.
- Lighting system Design: Design approach, Design Process, Concept o design, physical consideration and psychological consideration and types of
- Photometry: Measurement of illumination, photometers and filters.

PRACTICAL

1. f & μ of convex lens (f by u-v and shift method).
2. f & μ of concave lens (f of concave lens by u-v method, combined lens u-v m - Boy's method).
3. μ of the prism (i-d curve).
4. μ of slab - shift method (traveling microscope).
5. μ of liquid - shift method (traveling microscope).
6. f of convex mirror.
7. f of concave mirror (μ-v graph).
8. Verification of laws of reflection - plane mirror.
9. Verification of laws of refraction - glass slab - pin method (μ by lateral shift)
10. Resoling power of telescope.
11. Photodiodes - characteristics.
12. Plank's constant.

English

(Not for University Examination)

Min. Hrs. - Theory : 40 Hrs.

1. **Introduction:**
   Study techniques, Organisation of effective note taking and logical processes of ana and synthesis, the use of the dictionary, enlargement of vocabulary& effective dictic
2. **Applied Grammar:**
   Correct usage, the structure of sentences, the structure of paragraphs.
3. **Written Composition:**
   Precise writing and summarising, writing of bibliography, enlargement of vocabular
4. **Reading and comprehension**
   Review of selected materials and express oneself in one's words, enlargement of vocabulary.
5. **The study of various forms of composition paragraph, essay, letter, summary, pra in writing.**
6. **Verbal communication:**
   Discussions and summarization, debates, oral reports, use in teaching.

Computer

(Not for University Examination)

Min. Hrs - Theory : 30 Hrs., Practical : 30 Hrs.

Course Contents:

1. Input and Output units:
   Their functional characteristics, main memory, cache memory read only r
   overview of storage devices – floppy disk, hard disk, compact disk, tape. C
   Networks and Communication: Network types, network topologies.
2. Internet:
   Evolution , Protocols, Interface Concepts, Internet Vs Intranet, Growth of Intern
   SSS Connectivity – Dial-up, Leased line, VSAT etc. URLs, Domain names, Po
   MAIL- Concepts, POP and WEB based E-mail, merits, address, Basics of Ser
   Receiving, E-mail Protocols, Mailing List, Free E-mail services.
3. Electronic Payment Systems:
   Introduction, Types of Electronic payment systems, Digital Token- Based, Electro
   payment systems, Smart Card and Electronic payment systems, Credit Card- Base
   Electronic payment systems, Risk and Electronic payment systems.
4. Html :
   Concepts of Hypertext, Versions of HTML, Elements of HTML syntax, Head &
   Sections, Building HTML documents, Inserting texts, Images, Hyperlinks, Back
   and Color Controls, Different HTML tags, Table layout and presentation, Use of f
   & Attributes, List types and its tags, Use of Frames and Forms in web pages. Over
   MS Front Page, Macromedia Dream weaver, and other popular HTML editors, de
   web sites using MS Front Page (using at least Front Page 2000)

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B.Sc. in Optometry Second Year

Optometric Optics

Subject code - BOPT - 201

Min. Hrs. - Theory : 60 Hrs. & Practical: 60 Hrs.

THEORY

1. Spectacle Lenses :
   - Introduction to spectacle lenses.
   - Forms of lenses.
   - Cylindrical and sphero cylindrical lenses.
   - Properties of crossed cylinders.
   - Toric lenses, toric transposition.
   - Astigmatic lenses.
   - Axis Direction of astigmatic lenses.
   - Obliquely crossed cylinders.
   - Sag Formulae.
   - Miscellaneous spectacle lenses.
   - Vertex distance and vertex power.
   - Tilt induced power.
   - Aberrations in ophthalmic lenses .
   - Fresnel prisms, Lenses and Magnifiers.
   - Manufacture of glass.
   - Lens surfacing.
   - Principle of surface generation and glass cements.
   - Lens quality.
   - Faults in lens material.
   - Faults on lens surface.
   - Inspecting te quality of lenses.
   - Toughened lenses.
2. Ophthalmic Lenses :
   - Definition of prisms, Units of prism power.
   - Thickness difference and Base apex notations.
   - Dividing, Compounding and Resolving prisms.
   - Rotary prisms and effective prism power in near vision.
   - Prismatic effect, decentration, Prentice Rule.
   - Prismatic effect of spherocylinsders and Plano cylinders.
   - Differential prismatic effects.
3. Tinted and protective lenses :
   - Characteristics of tinted lenses.
   - Absorptive Glasses.
   - Polarising Filters.
   - Photochromic Filters.
   - Reflecting filters.
   - Bifocal lenses.
   - ~~Trifocal lenses.~~
   - Progressive addition lenses.
   - Lenticular lenses.

- Reflection from spectacle lenses, ghost images, Reflections in bifocals at the fl line.
- Antireflection coating, antiscratch coating, antifog coating, Mirror coating, edg coating, Hard Multi Coating (HMC)
- Field of view of lenses
- Size, shape of view of lenses
- Aspherical lenses

4. Spectacle Frames :
   - Types and parts.
   - Classification of spectacle frames-material, weight, temple, position, coloration
   - Frame construction, frame measurements and markings.
5. Dispensing Optics :
   - Surfacing and polishing glass lenses.
   - Glazing.
   - Frame manipulation and repair.
   - Facial measurements and frame choice.
   - Frame and dimension measurements of complete pair of spectacles.
   - Complete dispensing for subjects.
   - Special lenses – examination of specimens.
   - Lens faults in sections.
   - Measurements of assorted faces for spectacle.
   - Making and edging of bifocal lenses.
   - Edging of lenses for plastic, metal and rimless frames.
   - Joining plastics by different solvents.

PRACTICAL

Practical work related to
1. Spectacle lenses
2. Ophthalmic lenses
3. Spectacle frames & dispensing optics.

Visual Optics

Subject Code - BOPT - 202

Min. Hrs. - Theory: 60 Hrs. & Practical: 70 Hrs.

THEORY

1. Review of Geometric Optics :
   - Vergence and power.
   - Conjugacy, Object space and image space.
   - Sign convention.
   - Spherical Mirror.
   - Catoptric power.
   - Cardinal points.
   - Magnification.

2. **Optics of Ocular Structures :**
   - Cornea and aqueous.
   - Crystalline lens.
   - Vitreous.
   - Schematic and reduced eye.
   - Corneal curvature and thickness.
   - Keratometry.
   - Curvature of the lens and ophthalmophakometry.
   - Axial and axis of the eye.
3. **Refractive anomalies and their causes :**
   - Etiology of refractive anomalies.
   - Contributing variabilities and their ranges.
   - Populating distributions and their ranges.
   - Optical component measurement.
   - Growth of eye in relation to refractive errors.
   - Emmetropia.
   - Myopia .
   - Hyperopia.
   - Astigmatism.
   - Anisometropia and Aniseikonia.
   - Presbyopia.
   - Aphakia and pseudophakia.
   - Correction and management of Amblyopia.
4. **Far and near points of Accommodation and Vertex Distance :**
   - Correction of spherical Ametropia.
   - Axial versus refractive ametropia.
   - Relationship between Accomodation and convergence, A/C Ratio.
   - Ocular refraction versus spectacle refraction.
   - Ocular accommodation versus spectacle accommodation.
   - Spectacle magnification and relative spectacle magnification.
   - Retinal image blur. Depth of focus and depth of field.
5. **Retinoscopy : Principles and Methods :**
   - Retinoscopy-speed of reflex and optimum condition.
   - Retinoscopy-Dynamic and Static.
   - Review of objective refractive method.
   - Cross cylinder method for astigmatism, astigmatic fan test.
   - Difficulties in objective tests and their avoidance.
   - Transposition of lenses.
   - Spherical equivalent
   - Prescribing prism
   - Binocular Refraction.

PRACTICAL

PART I

1. Study of purkinje images I & II, III &IV.
2. Measurements of corneal curvature and corneal thickness.
3. Mathematical models of the eye-Emmetropia, Hyperopia, & Myopia.
4. Conjugate points-demonstration,worked examples.
5. Axial and ~~refractive hyperola~~-worked examples.
6. Axial and refractive Myopia-worked examples.

7. Effect of lenses in front of the eye.
8. Effect of prism in front of the eye.
9. Vision through pinhole, slit filters etc.

PART II

1. Phorometry.
2. Visual acuity Stereoacuity in emmetropia.
3. Myopia and pseudomyopia, Myopia and visual acuity .
4. Hypermetropia determination of manifest error subjectively
5. Myopic correction-subjective verification-monocular and binocular. Demons astigmatism. Use of slit and keratometry to find principle meridians. Sti subjective verification tests.
6. Measurement of accommodation –near and far points and range.
7. Presbyopic correction and methods – accommodative reserve balancing th accommodation –cross grid test.
8. Methods of differentiating axial and refractive ametropia.
9. Practice of retinoscopy-Emmetropia.
   - Spherical ametropia
   - Simple astigmatism
   - Compound myopia and hyperopia
   - Oblique and irregular astigmatism
   - In media opacities
   - In strabismus and eccentric fixation
10. Interpretation of cycloplegic retinoscopic findings
    - Prescription writing
    - Binocular refraction
    - Vision therapy
    - Photo refraction
    - Exercise for vergence

Optometric instruments & clinical examination of visual syst

Subject code - BOPT - 203

Min. Hrs. - Theory: 60 Hrs. & Practical: 70 Hrs.

THEORY

1. Refractive Instruments :
   - Test charts standards, choice of test charts.
   - Trial case lenses-Best form lenses.
   - Reractor head units, optical considerations of refractor units.
   - Trial frame design.
   - Near vision difficulties with units and trial frame.
   - Retinoscope-types available.
   - Adjustments of retionscopes – special features.
   - Cylinder retinoscopy.
   - Interpretation of objective findings.
   - Interpretation of objective tests-polarising and displacement
   - Projection charts.
   - Illumination of the consulting room special insurments
   - Brightness acuity tester.

- Vision analyzer.
- Video acuity test.
- Pupilometer, Lensometer, lens gauge or clock, Refractionometer, Keratometer corneal topography.

2. **Other Instruments :**
   - Slit lamp.
   - Tonometer – Principle, uses and types.
   - Ophthalmoscopes and related devices.
3. **Special Equipments :**
   - Fundus camera.
   - Orthoptic instruments.
   - Colour vision testing devices.
   - Fields of vision and screening devices.
   - Opthalmic ultra sonography - ultrasound/ A scan/ Bscan/ UBM.
   - Electodiagnostics - ERG/VPG/EOG.
   - Nerve fiber analyzer.
   - Scanning laser devices.

PRACTICAL

1. **Demonstration of various instruments.**
2. **Clinical examination of the visual system :**
   - History of the ophthalmic subject.
   - Ocular symptoms, the past prescriptions-its influence.
   - Visual acuity testing-distance and near and colour vision.
   - Examination of muscle balance.
   - Examination of eye lids, conjunctiva & sclera.
   - Examination of cornea, lens.
   - Examination of iris, ciliary body and pupil.
3. **Special examinations :**
   - Examination of intraocular pressure & examination of angle of anterior chambe
   - Ophthalmoscopy – (direct and indirect).
   - Examination of fundus.
   - Examination of lacrimal system.
   - Examination of orbit.
   - Macular function test.
   - Visual field charting – (central & periphery).
   - Neuro-opthalmological examination.

General Pathology & General Microbiology

Subject code - BOPT - 204
Min. Hrs. - Theory: 70 Hrs. & Practical: 60 Hrs.

THEORY

General Pathology:

1. Cell Injury and Cellular Adaptations:
- Normal Cell
- Cell Injury- types of cell injury, etiology of cell injury, morphology of ce cellular swelling (in brief)
- Cell death : types- autolysis. necrosis, apoptosis & gangrene (in brief)
- Cellular adaptations-atrophy, hypertrophy, hyperplasia & dysplasia (in brief)

2. Inflammation :
- Acute inflammation - vascular event, cellular event, inflammatory cells(in br
- Chronic Inflammation - general features, granulomatous inflammation, tub (in brief)

3. Haemodynamic Disorders :
- Oedema, hyperemia, congestion, haemorrage, circulatory disurbances, thr ischaemia & infarction (in brief)

4. Neoplasia :
- Definition, how does it differ from hyperplasia, difference between benign tu malignant tumor (in brief)

5. Healing:
- Definition, different phases of healing, factors influencing wound healing. (Ophthalmic wound healing

General Microbiology :

1. General characters and classification of Bacteria.

2. Sterilization and Disinfection :
- Physical agents- Sunlight, Temperature less than 100°C, Temperature at 100°C at atmospheric pressure and steam under pressure, irradiation, filtration.
- Chemical agents- Alcohol, Aldehyde, Dyes, Halogens, Phenols, Ethylene oxide

3. Staining Methods :
- Simple, Grams staining, Ziehl-Neelsen staining or AFB staining, Negative Impregnation .

4. Collection and Transportation of Specimens :
- General Principles, Containers, Rejection.
- Samples - Urine, Faeces, Sputum, Pus, Body fluids, Swab, Blood

5. Disposal of Laboratory/Hospital Waste :
Non-infections waste, infected sharp waste disposal, infected non-sharp waste disposal.

6. Parasitology :
Parasitism, host & vectors etc., classification of parasites, diseases caused by va parasites (in very brief)

7. Mycology :
Morphology & structure of fungi (in brief), classification of fungi, lab diagnosis fungal infections, opportunistic fungal infections

8. Virology :

General characters of viruses, classification of viruses, lab diagnosis of vira infections (in brief).

9. Nosocomial Infections (in brief)

10. Common fungal, viral and parasitic infections of the eye

PRACTICAL

General Pathology :

1. Collection of blood and anticoaguants used.
2. Estimation of Hemoglobin, R.B.C., W.B.C., T.L.C., D.L.C., E.S.R. Count.
3. Blood Indices, Blood grouping, Bleeding & Clotting time.

General Microbiology :

1. Preparation of Swabs/ sterile tubes & bottles.
2. Preparation of smear.
3. Staining : Grams & Ziehl- Neelson
4. Identification of culture media.
5. Identification of instruments.
6. Identification of common microbes.
7. Culture media used for fungus.

Biostatistics, Epidemiology & Occupational Optometry

Subject code - BOPT - 205

Min. Hrs..- Theory: 70 Hrs.

THEORY

Biostatistics :

1. **Introduction:** Meaning, definition, characteristics of statistics. Importance of th of statistics, Branches of statistics, Statistics and health science , Parameter Estimates, Variables and their types, Measurement scales.
2. **Tabulation of Data:** Basic principles of graphical representation, Typ diagrams – histograms, frequency polygons, smooth frequency polygon, cum frequency curve, Normal probability curve.
3. **Measures of Central Tendency:** Need for measures of central ten Definition and calculation of **Mean** – ungrouped and grouped, interpretatio calculation of **Median**-ungrouped and grouped, **Meaning** and calculation of M Geometric mean & Hormonic mean, Guidelines for the use of various measures of c tendency.
4. **Measures of Dispersion :** Range, mean deviation, standard deviation & variance,
5. **Probability and Standard Distributions:** Meaning of probability of sta distribution, the binominal distribution, the normal distribution, Divergence normality – skewness, kurtosis.

6. Correlation & regression : Significance, correlation coefficient. linear regre regression equation.
7. Testing of Hypotheses , Level of significance, Degrees of freedom.
8. Chi-square test, test of Goodness of fit & Student t-test.
9. Analysis of variance & covariance: Analysis of variance (ANOVA), what is A Basic principle of ANOVA, ANOVA technique, Analysis of Co variance (ANAC
10. Sampling: Definition, Types- simple, random, stratified, cluster and double s Need for sampling - Criteria for good samples, Application of sampling in con Procedures of sampling and sampling designs errors.
11. Time series analysis, Method of determining trend, Utility of time series.

Epidemiology:

- Definition
- Basic Measurements in epidemiology (in brief)
- Incidence & prevalence
- Epidemiological studies (in brief)
- Definition of epidemic, endemic, sporadic, pandemic, exotic, zoonosis, epiz epornithic.
- Natural history of disease, Transmission of disease.
- Surveillance

Law and Optometry :

- Legal environment techniques-History – law and equity
- History and theory of licensure
- Licensure as a means of internal and external discipline- unprofessional incompetence-gross immorality
- International optometry- important foreign optometry law .
- Optometrist in court
- Malpractice-theory of liability-damages-minimizing malpractice claims
- Insurances
- Negligence
- Ethics-Professional ethics
- Laws governing practice of medical and paramedical profession in India
- Registered councils of India- Medical council, Dental council, & Nursing coun
- Present rules and regulations-laws regarding optical product manufacturers disp in India
- Opticians – are they registered? Dispensing opticians-rules in UK

12. Public Health and Community Optometry :

- Global medicine and evolution of public health in India
- Public health of optometry-concepts and implementation
- Health care delivery systems in India and determinants of health
- Levels of prevention-optometrist's role in community
- Concepts of national Health Programme
- Screening in population
- Epidemiology of Blindness-Cataract, Glaucoma & deficiency disorders
- Scope of geriatric ophthalmology in preventive and rehabilitation care
- National and international agencies in health plan
- Fundamentals of health economics, health plan
- Quality assessment in health delivery programmes

13. **Occupational Optometry :**
   - Introduction to occupational health, hygiene and safety International bodie. WHO, national bodies like labour institutes, National institutes of occupatio. national safety council etc.

General Pharmacology & Ocular Pharmacology

Subject code - BOPT - 205

Min. Hrs. - Theory: 60 Hrs.

THEORY

1. General Pharmacology :
   - Introduction and sources of drugs
   - Routes of drug administration
   - Pharmacokinetics-special emphasis on ocular pharmacokinetics
   - Adverse drug reactions-Special emphasis on ocular toxicity of drugs
   - Factors modifying drug action
2. **Systemic Pharmacology :**
   - Autonomic Nervous System :- Introduction, Neurotransmitters, their mech action, Drugs affecting-
     - Pupillary Size and Light Reflex,
     - Intraocular Tension,
     - Accommodation,
   - Skeletal Muscle Relaxants
   - Cardiovascular System: Antihypertensives and drugs useful in Angina
   - Central Nervous System: Alcohol, Sedative, Hypnotics, General anesthetics, L anesthetics, Opiods and non opiods
3. Others :
   - Chemotherapy: Introduction, general chemotheraphy, Specific chemotherapy - Antifungal, Antiviral, Antitubercular & Antileprotic chemotherapy
   - Hormones: Corticosterids, Antidiabetics
   - Blood: Coagulants
   - Diuretics
4. Ocular Pharmacology :
   - Ocular preparations, formulations and requirements of an ideal agents.
   - Ocular pharmacokinetics-Methods of drug administration, Special drug d systems.
   - Ocular toxicology.
5. **Diagnostic and Theraputic applications of drugs in Opthalmology :**
   - Agents used to aid diagnosis.
   - Drugs and biological agents used in ocular surgery.
   - Anesthetics used in ophthalmic procedures.
   - Drug treatment of glaucoma, accommodative esotropia and ocular myasthenia
   - Pharmacotherapy of ocular infections-Bacterial, Viral, Fungal, Chlamydial.
   - Drugs used in inflammatory disorders of the eye.
   - Drug treatment of degenerative disorders of the eye.

- Immunomodulators in ophthalmic practice.
- Use of other agents in ophthalmic practice:- Enzymes, Vitamins, Trace elem Antioxidants, Wetting agents, Tear substitutes.

Clinical work at Hospital
Subject code - BOPT- 207
Min. Hrs. - Practical: 80 Hrs.

1. Case sheet
2. History taking
3. Lensometry
4. External examination
5. Test for phorias and tropias
6. Visual acuity
7. Objective Refraction
8. Subjective Refraction
9. Keratometry
10. Slit lamp examination [Applanation tonometry]
11. Drugs and method of application
12. Do's and Don'ts – pupillary dilatation
13. Direct ophthalmoscopes
14. Indirect ophthalmoscopes

- **The Students of IInd year shall do above the clinical work at Ophthalmology department of the hospital (including OPD & IPD).**
- **They shall maintain logbooks of patients.**
- **At the end of academic year their logbooks will be evaluated by the faculty concerned.**

Squint & Binocular Vision

Subject code - BOPT - 301

Min. Hrs. - Theory: 50 Hrs. & Practical: 60 Hrs.

THEORY

1. **Spatial Sense :**
   - Evolution of binocular vision
   - Binocular fusion, suppression, rivalry & summation
   - Visual direction, local sign & corresponding points
2. **Panum's Space :**
   - Stereopsis
   - Development of Binocular vision
   - The longitudinal horopter
   - Neural aspects of binocular vision
   - Visually guided behaviour and aniseikonia
   - ARC
3. **Qualitative & Quantitative diagnosis of Strabismus :**
   - Esodeviation
   - Exodeviation
   - A-V Phenomenon
   - Cyclovetical squint
   - Psuedostrabismus
4. **Amblyopia and Eccentric fixation :**
   - Treatment of amblyopia
   - Special froms of strabismus
5. **Nystagmus :**
   - Non surgical management of strabismus

PRACTICAL

1. To identify the patients of above problems.
2. History taking & maintaining logbooks
3. Plan of non surgical management of above problems.

Contact Lens

Subject code - BOPT - 302

Min. Hrs. - Theory: 50 Hrs. & Practical: 70 Hrs.

THEORY

1. History of Contact Lens :
   - Corneal anatomy and physiology.
   - Corneal physiology and contact lens.
   - Preliminary measurements and investigations.
   - Slit lamp biomircoscopy.
   - Contact Lens Materials .
   - Optics of Contact Lens.
   - Glossary of terms: Contact Lenses.
2. Indications and Contraindications of Contact Lenses
   - RGP contact lens design.
   - Soft contact lens design.
   - Keratometry, Placido's disc, Topography.
3. Fitting Philosophies [Introduction to Contact Lens fitting] :
   - Handling of CL.
   - Fitting of spherical soft CL and effects of parameter changes.
   - Astigmatism: Correction options.
   - Fitting spherical RGP CL, low DK and high DK.
   - Effects of RGP CL parameter changes on lens fitting.
   - Fitting in astigmatism.
   - Fitting in keratoconus.
   - Fitting in aphakia , pseudophakia.
   - Lens care and hygiene instructions compliance.
   - Follow up post fitting examination.
   - Follow up slit lamp examination.
   - Cosmetic CL.
   - Fitting CL in children.
4. IC CL :
   - Bifocal CL.
   - Continuous wear and extended wear CL.
   - Therapeutic CL/Bandage lenses.
   - CL following ocular surgeries .
   - Disposable CL, Frequent replacement lenses .
   - Use of secular microscopy and pachymetry in CL.
   - Care of CL, CL solutions
   - Complications of CL.
   - CL modification of finished lenses.
   - Instrumentation in CL practice.
   - Checking finished lens parameters
   - CL special purpose [illegible]

- Recent developments in CL.
- Review of lenses available in India.
- Currnet CL research

5. **Dispensing Optics :**
   - Curvature and power measurements of typical contact lenses.
   - Edging and polishing curves of contact lenses.
   - Visit to factories making lenses and contact lenses.

PRACTICAL

1. Patient Selection (Type of Contact Lens).
2. Performing Procedure of contact leans fitting :

   Procedures for soft Lens :
   - Fitting of trial based on the refractive correction & keratiometry
   - Slit lamp examination to assess the fitting of CL
   - Perform over refraction
   - Prescribe the final basecurve & power of CL

   Procedures for RGP Lens :
   - Fitting of trial lens based on the refractive correction & keratometry
   - Evaluate the fluoresce in pattern under the slit lamp to finalise the base curv the CL
   - Select the trial lens with the final base curve & required power
   - Perform over refraction
   - Prescribe the final base curve & power of contact lens

Ocular diseases

Subject code - BOPT - 303

Min. Hrs. - Theory: 80 Hrs. & Practical: 60 Hrs.

THEORY

1. Ocular Adnexa :
   - Congenital and developmental anomalies of eyelids, Blepharospasm; Ectropi entropion, Trichiasis and Symblepharon, Eyelid inflammations , Eyelid tu Ptosis, Eyelid retractions, Eyelid trauma, Methods of lacrimal evacuation, Con and developmental anomalies of lacrimal system, Lacrimal obstructions, Lacri tumours, Lacrimal trauma, Ectasia and staphyloma, Scieritis and Epis Congenital and developmental anomalies of orbit, Orbital tumours, inflammations, sinus disorders affecting the orbit, Orbital trauma, s inflammatory diseases, Tumors of epithelial origin, Glandular and adenexal tu Tumours of neuroectodermal origin, Vascular tumours, Xanthomatous l Inflammatory lesions, Metastatic tumours, Degenerations and dystro Definitions, Miscellaneous conditions, Keratoconjunctivitis Sicca, Steven J Syndrome, Ocular Rosacea, Atopic eye disorders, Benign Mucosal Pemphi ocular pemphigoid , Vitamin A deficiency, Metabolic diseases associated with changes.

2. Lens :
   - Aging process
   - Developmental defects.
   - Acquired lenticular defects.
   - Management of lenticular defects.
3. Uveal Tract :
   - Congential anomalies.
   - Primary and secondary diseases of iris and ciliary body.
   - Tumours.
   - Anomalies of papillary reactions.
   - Congenital anomalies of choroids.
   - Diseases of choroids.
4. **Vitreous and Retina :**
   - Developmental abnormalities , Hereditary hyaloidoretinopathies, J retinoschisis, Asteroid hyalosis, Cholesterolosis, Vitreous haemorrhage, Blunt and the vitreous, Inflammation and vitreous, Parasitic infestations, Pigment g in vitreous, Vitreous complications in cataract surgery, Retinal vascular d Diseases of choroidal vasculature, Bruchs membrance and retinal pigment epit Retinal tumours , Retinoblastoma, Phakomatoses, Retinal vascular anomalies, and optic nerve head astrocytomas, Other retinal disorders, Retinal inflamm Metabolic diseases affecting the retina, Miscellaneous disorders, Electrom radiation effects the retina, Retinal physiology and psychophysics, Hereditary r disorders including albinism, Peripheral retinal degenerations. Rentinal ho detachment, Intraocular foreign bodies, Photo coagulation.
5. **Others :**
   - Neuro ophthalmic examination : History , Visual function testing , Techn pupilary examination , Ocular motility, Checklist for testing , Visual sensory The retina, The optic disc, The optic nerve, Optic chiasma, Optic tracts, geniculate body, Optic radiations, Visual cortex, Visual field, Blood su anterior and posterior visual systems, Disorders of visual integration
   - Ocular motor systems: Saccadic system, Clinical disorders of saccadic systen palsies, Progressive supranuclear palsy, Parkinson's diseases, Ocular motor a Ocular oscillation, Smooth pursuit system and disorders, Vergence system, Ce system, Non visual reflex system, Position maintenance system, Nystagmus, motor nerves and medical longitudinal fasciculus, The facial nerve, Pa sensation from the eye, Autonomic nervers system 32, Selected systemic di with neuro ophthalmologic signs.
   - An overview of glaucoma: Aqueous humour dynamics – gonioscopy Evalua optic-nerve head, Visual fields, Glaucoma screening, Classification of glau Primary open angle glaucoma, Primary angle closure glaucoma , Primary co glaucoma. Secondary glaucoma, Principles of medical therapy, Other modal glaucoma treatment, Social implications, Rationale in therapy.
   - Drug induced ocular diseases, eye and systemic diseases: arterial hyper diabetes mellitus, acquired heart diseases – embolism, cancer – introd connective tissue diseases, Thyroid disease, tuberculosis , helminthiasis, c tropical medical aliments, malnutrition, introduction to immunology, neur disorders, general medical emergencies – first aid, genetics.

PRACTICAL

1. Selection of patients of above diseases
2. History taking & maintaining logbooks
3. Plan of non nurgical management of above diseases

Low vision aids

Subject code - BOPT - 304

Min. Hrs. - Theory: 50 Hrs. & Practical: 50 Hrs.

THEORY

1. **Identifying the low vision patients:**
   - History .
   - Diagnostic procedures in low vision case management.
2. **Optics of low vision aids :**
   - Refraction, special charts, radical radioscopy.
   - Evaluating near vision-amsler grid and field defects, prismatic scanning.
   - Demonstrating aids-optical, non optical, electronic.
3. **Teaching the patient to use aids including eccentric viewing training necessary :**
   - Spectacle mounted telescopes and microscopes.
   - Guidelines to determine magnification and selecting low vision aids for distanc intermediate and near vision .
4. **Children with low vision :**
   - Choice of tests, aids in different pathological conditions.
   - Light, glare and contract in low vision care and rehabilitation
   - Bioptic telescope.
5. **Optical devices to help people with field defects :**
   - Contact lens combined system
   - Rehabilitation of the visually handicapped

PRACTICAL

1. Practical work related to above theory topics
2. Maintaining manual/ logbooks of the practical work.

Geriatric & Pediatric Optometry

Subject Code - BOPT - 305

Min. Hrs. - Theory: 50 Hrs. & Practical: 50 Hrs.

THEORY

Pediatric Optometry

1. History :
   - Genetic factors ,Prenatal factors, Perinatal factors
   - Postnatal factors, Measurement of visual acuity, normal appearance, patholo structural anomalies., Orbit, Eyelids, Lacrimal system Conjunctiva. Cornea. Anterior chamber, uveal tract, pupils, Lens, Vitreous, Funds, Oculomotor s Measurement of refractive status, Determining binocular status. Determining s motor adoptability
2. Compensatory treatment and remedial therapy for :
   - Myopia, Pseudo myopia, Hyperopia, Astigmatism, Anisometropia & Amblyopi
3. Remedial and compensatory treatment for strabismus and Nystagmus :
   - vergence and accommodation

Geriatric Optometry:

1. Structural changes in the eye.
2. Physiological changes in the eye.
3. Optical and refractive changes in the eye.
4. Aphakia, psuedophakia-it's correction.
5. Ocular diseases common in old eye, with special refrence to cataract disorders, vascular diseases of the eye
6. Special considerations in Ophthalmic dispensing to the elderly

- Management of visual problems of aging
- How to carry on one's visual tasks overcoming the problems of aging.

PRACTICAL

1. Practical work related to pediatric & geriatric optometry.
2. Maintaining manual/ logbooks of the Practical work

Clinical work at Hospital

Subject code : BOPT- 306

Min. Hrs. P[illegible] 80 Hrs

Clinical work :

1. Case sheet
2. History taking
3. Lensometry
4. External examination
5. Test for phorias and tropias
6. Visual acuity
7. Objective Refraction
8. Subjective Refraction
9. Keratometry
10. Slit lamp examination [Applanation tonometry]
11. Drugs and method of application
12. Do's and Don'ts – pupillary dilatation
13. Direct ophthalmoscopes
14. Indirect ophthalmoscopes

For Contact Lens Patients :

1. Patient selection [Type of Contact lens]
2. Performing Procedure of contact lens fitting

- **The students of IIIrd year shall do above the clinical work at Ophthalmolog department of the hospital (including OPD & IPD).**
- **They shall maintain logbooks of patients.**
- **At the end of academic year their logbooks will be evaluated by the faculty concerned.**

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CURRICULUM VITAE

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PROFESSIONAL QUALIFICATIONS

S. No	Institute/ College	University	Course Name	Year of Passing	Class
1	Indira Gandhi National Open University (IGNOU) New Delhi INDIA	Indira Gandhi National Open University (IGNOU), New Delhi	Doctor of Philosophy (Ph D.) thesis on " Impact of Hospital & Community Based Low Vision services on Quality of Life of Visually Impaired People under NPCB in Chandigarh"	2017	-
2	School of Optometry, Medical College, BVDU, Pune INDIA	Bharati Vidyapeeth Deemed University, Pune, Maharashtra	M. Optom (Master of Optometry)	2006	1st Class
3	L. R. P. Centre for Ophthalmic Sciences, A.I.I.M.S., Ansari Nagar New Delhi-110029, INDIA	(A.I.I.M.S.) All India Institute of Medical Sciences, New Delhi	B.Sc. (Hons.) in Ophthalmic Tech. Optometry)	1997	1st Class

OTHER PROFESSIONAL QUALIFICATIONS

S. No	Institute/ College	University	Course Name	Year of Passing
1.	Kurukshetra University, Kurukshetra, Haryana, INDIA	Kurukshetra Univ., Kurukshetra	P G Diploma in Computer Applications	2003
2.	Indira Gandhi National Open University (IGNOU) New Delhi, INDIA	Indira Gandhi National Open University (IGNOU), New Delhi	P G Diploma in Marketing Management	2002

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CURRICULUM VITAE

NAME	**Dr. KAMAL PANT**
FATHER'S NAME	Shri R. C. PANT
DATE OF BIRTH	19th December, 1975
NATIONALITY	Indian
MARITAL STATUS	Married
OFFICIAL ADDRESS	Department of Optometry, College of Paramedical Sciences, U.P. University of Medical Sciences, Saifai, Etawah (UP)-206130. INDIA.
RESIDENTIAL cum CORRESPONDING ADDRESS	TYPE-5, A-201, Paramedical Campus, U.P. University of Medical Sciences, Saifai, Etawah (UP)-206130. INDIA. Phone # +91-9458505810, 7055006702. E-mail I.D. kamalpant007@rediffmail.com
PRESENT JOB SECTOR	GOVERNMENT
LANGUAGES KNOWN	ENGLISH, HINDI.

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PROFESSIONAL QUALIFICATIONS

	Institute / College	University	Course Name	Year of Passing	Class
1	Indira Gandhi National Open University (IGNOU), New Delhi, INDIA	**Indira Gandhi National Open University (IGNOU), New Delhi**	Doctor of Philosophy (Ph.D.) thesis on " Impact of Hospital & Community Based Low Vision services on Quality of Life of Visually Impaired People under NPCB in Chandigarh"	2017	-
2.	School of Optometry, Medical College BVDU, Pune INDIA	**Bharati Vidyapeeth Deemed University, Pune, Maharashtra**	M. Optom (Master of Optometry)	2006	1st Class
3	Dr. R. P. Centre for Ophthalmic Sciences, A.I.I.M.S., Ansari Nagar, New Delhi-110029 INDIA	**(A.I.I.M.S.) All India Institute of Medical Sciences, New Delhi**	B.Sc. (Hons.) in Ophthalmic Tech. Optometry)	1997	1st Class

OTHER PROFESSIONAL QUALIFICATIONS

S. No.	Institute/ College	University	Course Name	Year of Passing
1	Kurukshetra University, Kurukshetra, Haryana, INDIA	Kurukshetra Univ., Kurukshetra	P G Diploma in Computer Applications	2003
2	Indira Gandhi National Open University (IGNOU) New Delhi, INDIA	**Indira Gandhi National Open University (IGNOU), New Delhi**	P G Diploma in Marketing Management	2002

AWARDS & HONOURS	
1.	Best B.Sc. (Hons.) Ophthalmic Student (Year-1996) at R. P. Centre's XXX Foundation Day Celebration held on 10th March, 1997 at AIIMS, New Delhi.
2.	Received "Fellow" Title of International Association of Contact Lens Educators (IACLE), Sydney (Australia) in 2008.
3.	Young Leaders (Optometry) Award at IVI, Hyderabad in 2015.

TEACHING EXPERIENCE:

S. No.	Designation / Post Held	Organisation / Institute	Period	No. of years	Remarks
1.	*Dean, Faculty of Paramedical Sciences*	U.P. University of Medical Sciences, Saifai, Etawah (UP)-206130. INDIA.	16-09-2017 to date	3 months	
2.	*Associate Professor & Head*	Department of Optometry, College of Paramedical Sciences, U.P. University of Medical Sciences, Saifai, Etawah (UP)-206130. INDIA.	07-12-2012 to date	5 years	
3.	*Optometrist*	Dept. of Ophthalmology, Govt. Medical College & Hospital, Sec.-32-B Chandigarh-160030. INDIA	15-12-1999 to 06-12-2012	→ 9 years & 4 months → 12 years	→ August, 2003 to December, 2012 (As Educator for B.Optom.) → Jan.2001 to Dec. 2012 (As IACLE, Sydney certified educator)

RESEARCH PUBLICATIONS/ PUBLICATIONS	
1.	"Low Vision Devices" published in Naplese journal of Ophthalmology, 2010 2(3) 73-77.
2.	"Impact of Hospital-based Low Vision Services on the quality of life of the visually

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AWARDS & HONOURS

1. Best B.Sc (Hons.) Ophthalmic Student (Year-1996) at R. P. Centre's XXX Foundation
2. Best Education award on 10th March, 1997 at AIIMS, New Delhi
3. Awarded "Fellow" title of International Association of Contact Lens Educators (IACLE), Sydney (Australia) in 2008
4. Young Leaders (Optometry) Award at IVI, Hyderabad in 2015.

TEACHING EXPERIENCE:

S. No.	Designation / Post Held	Organisation / Institute	Period	No. of years	Remarks
1.	*Dean Faculty of Paramedical Sciences*	U.P. University of Medical Sciences, Saifai, Etawah (UP)-206130. INDIA.	16-09-2017 to date	3 months	
2.	*Associate Professor & Head*	Department of Optometry, College of Paramedical Sciences, U.P. University of Medical Sciences, Saifai, Etawah (UP)-206130 INDIA	07-12-2012 to date	5 years	
3.	*Optometrist*	Dept. of Ophthalmology, Govt. Medical College & Hospital, Sec -32-B, Chandigarh-160030. INDIA	15-12-1999 to 06-12-2012	→ 9 years & 4 months → 12 years	→ August, 2003 to December, 2012 (As Educator for B.Optom.) → Jan.2001 to Dec. 2012 (As IACLE, Sydney certified educator)

RESEARCH PUBLICATIONS/ PUBLICATIONS

1.	"Low Vision Devices" published in Naplese journal of Ophthalmology, 2010 2(3) 73-77
2.	"Impact of Hospital-based Low Vision Services on the quality of life of the visually

	impaired patients of Chandigarh" in Health and Population- Perspectives & Issues Journal of National Institute of Health & Family Welfare in Vol 38 (1& 2) jan-jun 2015.
3.	Authored Two Chapters/ Units for Course material of B.Optometry, IGNOU, New Delhi in 2010
4.	**Visual Field Changes with Coloured Cosmetic (Semi –Opaque) Soft Contact Lenses: A Pilot Study** (Online International Interdisciplinary Research Journal {Bi-Monthly}, ISSN 2229 [illegible] Sept-Oct 2017 Issue)
5.	**Impact of Cosmetic lenses on Contrast Sensitivity function in normal Contact lens wearers** (Asian J Med Health Res. 2017; 2(8) ISSN: 2455-8664)
6.	**Relation Between Activities Performed and Refractive Status of Optometry Students** (Asian J Med Health Res. 2017;2(9) ISSN: 2455-8664)
7.	**Impact of Visual Skills Training on the Performance of Sportspersons Involved in Outdoor Games** (Online International Interdisciplinary Research Journal, {Bi Monthly}, ISSN 2229-[illegible], Volume [illegible], Issue [illegible], Nov-Dec 2017 Issue)

PAPER PRESENTATIONS/ INVITED LECTURES & TALKS

1.	Contributed in the form of "Poster" in the 25th Indian Contact Lens Society conference on 3rd & 4th December, 1995 (New Delhi)
2.	Delivered a lecture on " Role of Optometrists in Rehabilitation of Visually Impaired" at Institute for the Blind, Chandigarh in the Workshop on 'Visual Impairment Management' (21st October, 2003).
3.	Oral Paper presentation on " Peripheral Visual Field Changes with Colored Cosmetic Soft CLs" in Indo Vision Care & CL Congress in October, 2007 at New Delhi.
4.	Conducted the workshop on "Low Vision Training" on 21st -23rd March, 2008 at Institute for the Blind, Chandigarh
5.	Presented invited lecture on "Colour Vision Tests" during the CME on "Recent Advances in Ophthalmology" on 13th December, 2009 at Third Eye Hospital, Jalandhar.
6.	Paper presentation on "Low Vision Devices: Our Experience" in NZOS & Uttara-EyeCon 2010 and won Best free paper award.
7.	Conducted the workshop for the Teachers' of the U.T. Government on "Eye care" during 1st week of March, 2010 at Institute for the Blind, Chandigarh.
8.	Delivered a lecture on "CL in Keratoconus" at Grewal Eye Institute, Chandigarh 2010.
9.	Delivered lecture on "Soft Contact lens material: Newer dimensions" during the CME-I

	[illegible] patients. [illegible] Chandigarh" in Health and Population- Perspectives & Issues Journal of National Institute of Health & Family Welfare in Vol 38 (1& 2) jan-jun 2015.
5.	Authored Two Chapters/ Units for Course material of B.Optometry, IGNOU, New Delhi [illegible]
	Peripheral Field Changes with Coloured Cosmetic (Semi –Opaque) Soft Contact Lenses – A Pilot Study [illegible]
	Impact of Cosmetic lenses on Contrast Sensitivity function in normal Contact lens wearers (Asian J Med Health Res 2017, 2(8) ISSN 2455-8664)
6.	Relation Between Activities Performed and Refractive Status of Optometry Students (Asian J Med Health Res 2017,2(9) ISSN 2455-8664)
7.	Impact of Visual Skills Training on the Performance of Sportspersons Involved in Outdoor Games [illegible]

PAPER PRESENTATIONS/ INVITED LECTURES & TALKS

1.	Contributed in the form of "Poster" in the 25th Indian Contact Lens Society conference on 3rd & 4th December, 1995 (New Delhi)
2.	Delivered a lecture on " Role of Optometrists in Rehabilitation of Visually Impaired" at Institute for the Blind, Chandigarh in the Workshop on 'Visual Impairment Management' (21st October, 2003).
3.	Oral Paper presentation on " Peripheral Visual Field Changes with Colored Cosmetic Soft CLs" in Indo Vision Care & CL Congress in October, 2007 at New Delhi.
4.	Conducted the workshop on "Low Vision Training" on 21st -23rd March, 2008 at Institute for the Blind, Chandigarh
5.	Presented invited lecture on "Colour Vision Tests" during the CME on "Recent Advances in Ophthalmology" on 13th December, 2009 at Third Eye Hospital, Jalandhar.
6.	Paper presentation on "Low Vision Devices: Our Experience" in NZOS & Uttara-EyeCon 2010 and won Best free paper award.
7.	Conducted the workshop for the Teachers' of the U.T. Government on "Eye care" during 1st week of March, 2010 at Institute for the Blind, Chandigarh.
8.	Delivered a lecture on "CL in Keratoconus" at Grewal Eye Institute, Chandigarh 2010.
9.	Delivered lecture on "Soft Contact lens material: Newer dimensions" during the CME-I

	"Essentials of Soft Contact Lenses" of Optometrists Association Chandigarh on 21st August, 2011 at Chandigarh.
10.	Delivered a talk on Optometry on Doordarshan Chandigarh in 2013.
11.	Resource person for the Low Vision Workshop during Vision:2020 Conference at CL Gupta Eye Institute, Moradabad in June, 2015
12.	Delivered an Oral paper on "Role of Optometrists in Community Health Care" in Uttaracon, SRMS, Bareilly in June, 2016.
13.	Delivered an invited lecture on "ART of Refraction" in AIIMS Optometry Explorer 2.0. AIIMS, New Delhi in January, 2017.
14.	Delivered an invited lecture on "If's & But's of Optometry" in CL Gupta Eye Institute, Moradabad in May, 2017

PARTICIPATION/ CONTRIBUTION in CONFERENCES / CMEs/WORKSHOPS/SEMINARS/ SYMPOSIA:	
1.	26th All India Optometric Conference- 2nd & 3rd October, 1994. (New Delhi)
2.	27th All India Optometric Conference- 6th to 8th October, 1995. (Ahmedabad)
3.	25th Indian Contact Lens Conference- 3rd & 4th December, 1995. (New Delhi)
4.	28th All India Optometric Conference- 1st to 3rd December, 1996. (Bangalore)
5.	27th Indian Contact Lens Conference- 3rd & 4th October, 1998. (New Delhi)
6.	3rd International AIIMSONIANS Conference- 9th to 11th October, 1998. (New Delhi)
7.	30th All India Optometric Conference- 24th to 26th January, 1999. (Manesar)
8.	28th Indian Contact Lens Conference- 18th & 19th October, 1999. (Mussoorie)
9.	IACLE /Allergan Special Symposium: Diagnosis & Management of Dry Eye & Contact Lens Related Dryness- 2nd April, 2001. (New Delhi)
10.	IACLE India Educators' Meeting on 28th October, 2001 at Shankara Nethralaya (Chennai)
11.	IACLE India Educators' Meeting on 25th March, 2002 at Bharati Vidyapeeth Deemed University (Pune).
12.	IACLE India Educators' Meeting on 5th -6th October, 2002 at LVPEI (Hyderabad).
13.	XI Annual Conference of Vitreo-Retinal Society of India on 14th -16th February, 2003

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[illegible] Soft Contact Lenses" of Optometrists Association Chandigarh on 21st [illegible] 2014 at Chandigarh

10. Delivered a talk on Optometry on Doordarshan Chandigarh in 2013

11. [illegible] on topic "Low Vision" workshop during Vision 2020 Conference at CL Gupta Eye Institute, Moorfields, [illegible] in June, 2015

12. [illegible] an Oral paper on "Role of Optometrists in Community Health Care" in Uttaracon, [illegible] 2016.

13. [illegible] invited lecture on "ART of Refraction" in AIIMS Optometry Explorer 2.0, AIIMS, New Delhi in January 2017

14. Delivered an invited lecture on "Hits & Bits of Optometry" in CL Gupta Eye Institute, Moorfields in May 2017.

PARTICIPATION/ CONTRIBUTION in CONFERENCES / CMEs/WORKSHOPS/SEMINARS/ SYMPOSIA:

1.	6th All India Optometric Conference- 2nd & 3rd October, 1994 (New Delhi)
2.	27th All India Optometric Conference- 6th to 8th October, 1995. (Ahmedabad)
3.	25th Indian Contact Lens Conference- 3rd & 4th December, 1995 (New Delhi)
4.	28th All India Optometric Conference- 1st to 3rd December, 1996. (Bangalore)
5.	27th Indian Contact Lens Conference- 3rd & 4th October, 1998. (New Delhi)
6.	3rd International AIIMSONIANS Conference- 9th to 11th October, 1998. (New Delhi)
7.	30th All India Optometric Conference- 24th to 26th January, 1999. (Manesar)
8.	28th Indian Contact Lens Conference- 18th & 19th October, 1999. (Mussoorie)
9.	IACLE/Allergan Special Symposium: Diagnosis & Management of Dry Eye & Contact Lens Related Dryness- 2nd April, 2001 (New Delhi)
10.	IACLE India Educators' Meeting on 28th October, 2001 at Shankara Nethralaya (Chennai)
11.	IACLE India Educators' Meeting on 25th March, 2002 at Bharati Vidyapeeth Deemed University (Pune).
12.	IACLE India Educators' Meeting on 5th -6th October, 2002 at LVPEI (Hyderabad).
13.	XI Annual Conference of Vitreo-Retinal Society of India on 14th -16th February, 2003

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	(Chandigarh)
14.	IACLE India Educators' Meeting on 29th March, 2003 at AIIMS (New Delhi).
15.	World Council of Optometry General Delegates & Indian Optometric Association International Conference on 30th March-1st April, 2003 (Agra)
16.	Low Vision Awareness Program (LAP) on 18th -20th, 2005 at L V Prasad Eye Institute (Hyderabad).
17.	IACLE India Educators' Meeting on 27th -28th March, 2005 at Bharati Vidyapeeth University (Pune).
18.	XXth Annual Conference of Chandigarh Ophthalmological Society on 21st August, 2005 at GMCH (Chandigarh)
19.	CME on "Current trends in Ophthalmic Practice" on 21st January, 2007 at Grewal Eye Institute, Chandigarh.
20.	Indo Vision Care & Contact Lens Congress of NOA on 27th-28th October, 2007 at New Delhi.
21.	CME on "Recent Advances in Ophthalmology" on 13th December, 2009 at Third Eye Hospital, Jalandhar.
22.	XXIIIth Annual Conference of Chandigarh Ophthalmological Society on 28th-29th August, 2010 at GMCH (Chandigarh)
23.	IACLE India Educators' Meeting on 10th June, 2011 at Lotus College of Optometry (Mumbai).
24.	CME-1 "Essentials of Soft Contact Lenses" of Optometrists Association Chandigarh on 21st August, 2011 at Chandigarh.
25.	A Rose-K training lecture given by Dr. Paul Rose in October, 2011 at PGI Chandigarh.
26.	Eye Teach of ICEE on 8th- 9th October, 2011 at IVI, Hyderabad.
27.	Glaucoma Symposium organised jointly by COS & Glaucoma Society of India on 25th March, 2012 at GMCH-32, Chandigarh.
28.	CME-2 "Optometrist: The Sight Givers" of Optometrists Association Chandigarh on 12th April, 2012 at Chandigarh.
29.	9th General Assembly of International Agency for the Prevention of Blindness (IAPB) on 17th-20th September, 2012 at Hyderabad.

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	Chandigarh).
11.	[illegible] India Educators' Meeting on 29th March, 2003 at AIIMS (New Delhi)
12.	[illegible] Council of Optometry General Delegates & Indian Optometric Association International Conference on 30th March-1st April, 2003 (Agra)
13.	[illegible] Vision Awareness Program (LAP) on 18th -20th, 2005 at L V Prasad Eye Institute (Hyderabad)
	[illegible] India Educators' Meeting on 27th -28th March, 2005 at Bharati Vidyapeeth [illegible] (Pune).
18.	[illegible] Annual Conference of Chandigarh Ophthalmological Society on 21st August, 2005 at GMCH (Chandigarh)
19.	CME on "Current trends in Ophthalmic Practice" on 21st January, 2007 at Grewal Eye Institute, Chandigarh.
20.	Indo Vision Optic & Contact Lens Congress of NOA on 27th-28th October, 2007 at New Delhi
21.	[illegible] on "Recent Advances in Ophthalmology" on 13th December, 2009 at Third Eye Hospital, Jalandhar
22.	XXIII[illegible] Annual Conference of Chandigarh Ophthalmological Society on 28th-29th August, 2010 at GMCH (Chandigarh)
23.	[illegible] India Educators' Meeting on 10th June, 2011 at Lotus College of Optometry (Mumbai).
24.	CME-1 "Essentials of Soft Contact Lenses" of Optometrists Association Chandigarh on [illegible] August, 2011 at Chandigarh.
25.	A Rose-K training lecture given by Dr. Paul Rose in October, 2011 at PGI Chandigarh.
26.	[illegible] Reach of ICUE on 8th- 9th October, 2011 at IVI, Hyderabad.
27.	Glaucoma Symposium organised jointly by COS & Glaucoma Society of India on 25th March, 2012 at GMCH-32, Chandigarh.
28.	CME-2 "Optometrist: The Sight Givers" of Optometrists Association Chandigarh on 15th April, 2012 at Chandigarh.
29.	9th General Assembly of International Agency for the Prevention of Blindness (IAPB) on 17th-20th September, 2012 at Hyderabad.

30.	28th Low Vision Awareness Programme (LAP) On 21st September, 2012 at LVPEI, Hyderabad.
31.	XXVI Annual Conference of North Zone Ophthalmological Society (NZOS) Eye Con 2012 on 2nd-4th November, 2012 at Chandigarh.
32.	Workshop on "Eyeteach Research Methodology" on 29th-30th July, 2013 at Amity University, Manesar (Gurgaon).
33.	Workshop on "Public Eye Health" on 31st July, 2013 at Amity University, Manesar (Gurgaon)
34.	36th All India Optometry Conference on 6th-8th September, 2014 (Agra).
35.	11th Annual Conference of VISION 2020 "Excellence in Eye Care: Learnings & Practices" on 6th-7th June, 2015 at CL Gupta Eye Institute (Moradabad).
36	IACLE India Educators' Meeting on 24th-25th October, 2015 at Lotus College of Optometry (Mumbai)
37.	HPSOS Midterm Conference "Drishticon 2016" on 28th & 29th May, 2016 (Bareilly).
38.	Completed Online Series for Institutional development conducted by India Vision Institute, Hyderabad on 14th June, 2016.
39.	AIIMS Optometry Explorer 2.0 on 18th-20th January, 2017 at AIIMS (New Delhi).
40	AMI-I-CON-2017 on 1st-3rd April, 2017 at Amity University, Manesar (Gurgaon).
41.	IACLE International Educators' meeting September, 2017
42.	WCO & APOC Conference in September, 2017 (Hyderabad)

Memberships of Professional Bodies:

- Life Member of International Association of Contact Lens Educators
- Life Member of Indian Optometric Association
- Life Member of Optometry Council of India
- Life Member of AIIMSONIANS
- Life Member of Optometrists Association Chandigarh

SOCIAL & EXTRA CURRICULAR ACTIVITIES:

[illegible]	[illegible] Awareness Programme (LAP) On 21st September, 2012 at LVPEI [illegible]
[illegible]	[illegible] Annual [illegible] ference of North Zone Ophthalmological Society (NZOS) Eye Con [illegible] [illegible] vember, 2012 at Chandigarh
[illegible]	[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] ch Research Methodology" on 29th-30th July, 2013 at Amity [illegible] Gurgaon
[illegible]	[illegible] [illegible] [illegible] blic Eye Health" on 31st July, 2013 at Amity University, Manesar [illegible]
[illegible]	[illegible] [illegible] Indi[illegible] [illegible] metry Conference on 6th-8th September, 2014 (Agra).
[illegible]	[illegible] [illegible] [illegible] ference of VISION 2020 "Excellence in Eye Care: Learnings & [illegible] [illegible] June, 2015 at CL Gupta Eye Institute (Moradabad).
66.	IACLE India Educators' Meeting on 24th-25th October, 2015 at Lotus College of Optometry (Mumbai)
67.	[illegible] Medical Conference "Drishticon 2016" on 28th & 29th May, 2016 (Bareilly).
68.	[illegible] Online Series for Institutional development conducted by India Vision Institute, Hyderabad on 14th June, 2016.
69.	AIIMS Optometry Explorer 2.0 on 18th-20th January, 2017 at AIIMS (New Delhi)
70.	AMEECON-2017 on 1st-3rd April, 2017 at Amity University, Manesar (Gurgaon).
71.	IACLE International Educators' meeting September, 2017
72.	WCO & APOC Conference in September, 2017 (Hyderabad)

Memberships of Professional Bodies:

- [illegible] Member of International Association of Contact Lens Educators
- [illegible] Member of Indian Optometric Association
- [illegible] Member of Optometry Council of India
- [illegible] Member of AIIMSONIANS
- [illegible] Member of Optometrists Association Chandigarh

SOCIAL & EXTRA CURRICULAR ACTIVITIES:

1.	Participated in Eye Camp (w.e.f. 10-09-1996 to 17-09-1996) organized by Rotary Club of Bijnore, U P
2.	Participated in Eye Camp (w.e.f. 23-11-1996 to 30-11-1996) organized by Lions Club.
3.	Participated in Voluntary Blood Donation as a Master card donor on 1st October 2003, 2004, 2006 & 2007 at GMCH, Chandigarh on the occasion of National Voluntary Blood Donation day
4.	Rendered Voluntary Service during series of Health Camps for Children in slum & rural areas of UT, Chandigarh between 14-11-2003 to 14-03-2004 organized by Indian Red cross society, UT, Chandigarh.
5.	Participated in Special Olympics Lions' Club International Opening eyes programme and the Special Olympics, Bharat on 23rd-27th February, 2004 at Jawahar Lal Nehru Stadium, New Delhi.
6.	As a team member from GMCH-32, Chandigarh for examining the students having visual problems among Chandigarh Govt. School Children held between May & September, 2007.
7.	Rendered service during 37th Free Eye Operation Camp organised by Lions Club Chandigarh Central on 7th-16th October, 2007 at Chandigarh.
8.	Rendered service during Eye Operation Camp organised by Lions Club Chandigarh Harmony on 21st September, 2008 at Chandigarh.
9.	Organised series of Eye Awareness and Screening Camps in villages around Saifai during October, 2015 to February, 2016.
10.	Organised World Sight Day 2015 Celebrations in the Department of Optometry, U.P.RIMS & R, Saifai.
11.	Organised World Optometry Day 2017 Celebrations in the Department of Optometry, U.P U.M S , Saifai.

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IMPORTANT ACADEMIC ASSIGNMENTS:

S. No.	Appointments/ Academic Assignments	Duration
1.	Expert (Optometry) to judge the 14th State Level Vocational	2005

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1.	Participated in Eye Camp (w.e.f. 10-09-1996 to 17-09-1996) organized by Rotary Club of Jammu, J&K
2.	Participated in Eye Camp (w.e.f. 23-11-1996 to 30-11-1996) organized by Lions Club.
3.	Registered as Voluntary Blood Donation as a Master card donor on 1st October 2003. [illegible] GMCH, Chandigarh on the occasion of National Voluntary Blood [illegible]
4.	Rendered [illegible] during series of Health Camps for Children in slum & rural [illegible] Chandigarh between 14-11-2003 to 14-03-2004 organized by Indian Red [illegible] Chandigarh
	Participated in "Special Olympics Lions' Club International Opening eyes programme [illegible] the Special Olympics, Bharat on 23rd-27th February, 2004 at Jawahar Lal Nehru [illegible], New Delhi
6.	As a team member from GMCH-32, Chandigarh for examining the students having visual problem among Chandigarh Govt. School Children held between May & September, [illegible]
7.	Rendered service during 37th Free Eye Operation Camp organised by Lions Club Chandigarh Central on 7th-16th October, 2007 at Chandigarh.
8.	Rendered service during Eye Operation Camp organised by Lions Club Chandigarh Harmony on 21st September, 2008 at Chandigarh.
9.	Organised series of Eye Awareness and Screening Camps in villages around Saifai during October, 2015 to February, 2016.
10.	Organised World Sight Day 2015 Celebrations in the Department of Optometry, UP RIMS & R, Saifai
11.	Organised World Optometry Day 2017 Celebrations in the Department of Optometry, UP UMS, Saifai

IMPORTANT ACADEMIC ASSIGNMENTS:

S. No.	Appointments/ Academic Assignments	Duration
1.	Expert (Optometry) to judge the 14th State Level Vocational	2005

	Competition at GMSSS, Sector-32, Chandigarh.	
2.	Expert (Optometry) to judge the 15th State Level Vocational Competition at GMSSS, Sector-32, Chandigarh.	2006
3.	Board of Studies member of B.Optometry course of HIHT, Dehradun	2009
4.	Paper setter for IGNOU, New Delhi	2010 to date
5.	Evaluator for U.P. State Medical Faculty, Lucknow.	2013 to date
6.	Paper setter for TMU, Moradabad	2014 to date
7.	Paper setter and Evaluator for Rohailkhand University, Bareilly	2013 to date
8.	UG Practical Examiner (External) for SRMS IPS, Bareilly	2013 to date
9.	UG Practical Examiner (External) for TMU, Moradabad	2017 to date
10.	PG Practical Examiner (External) for Amity University, Manesar (Gurgaon)	2017 to date
11.	Paper setter for ITM University, Gwalior	2015 onwards
12.	Board of Faculty member of TMU, Moradabad	2015 -17
13.	Board of Studies member of Rohailkhand University, Bareilly	2016 onwards
14.	Board of Studies member of ITM University, Gwalior	2016
15.	Board of Studies member of U.P. University of Medical Sciences, Saifai	2017 onwards
16.	Internal Examiner for U.P. State Medical Faculty, Lucknow	2013 to date
17.	Internal Examiner for CSJM University, Kanpur	2015 to date
18.	Internal Examiner for U.P. University of Medical Sciences, Saifai	2017 to date
19.	Member of the Technical Advisory Group (Paramedical) of U.P. State Medical Faculty, Lucknow	2015 to date
20.	Member of the Academic Council of U.P. University of Medical Sciences, Saifai	2017
21.	Appointed Inspector for the affiliation of Optometry Courses by U.P. State Medical Faculty, Lucknow	2015
22.	Expert Committee member for Uttarakhand Open University, Haldwani	2015
23.	Syllabus and Curriculum updation for D.Optom. of U.P. State Medical	2015

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[illegible]		
24. [illegible]	Committee's Nodal Officer at UPUMS, Saifai	2015 onwards
25. [illegible]	[illegible] of College of Paramedical Sciences, Saifai	2013 to 2015
26. [illegible]	International Association of Contact Lens [illegible] Resource Centre at Department of Optometry, [illegible]	2016

[illegible]

(Dr. KAMAL PANT)

	Faculty, Lucknow	
24.	College Scholarship Committee's Nodal Officer at U.P.UMS, Saifai	2015 onwards
25.	Officiated as the Principal of College of Paramedical Sciences, Saifai on many occasions	2013 to 2015
26.	Centre Coordinator of International Association of Contact Lens Educators (IACLE) Resource Centre at Department of Optometry, UPUMS, Saifai.	2016

PLACE: Saifai (Etawah)
DATE: 13th December, 2017

(Dr. KAMAL PANT)

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Curriculum Vitae

Vikas Shrivastava

HOD,
Programme Coordinator & Examination coordinator(B.Optometry)
Assistant Professor,
Department of Optometry & Visual Sciences,
School of Medical & Allied Sciences,
Galgotias University, Greater Noida,(U.P)

Aim

As a professional in the field of Optometry, I have more than 20 yrs experience which is not only in clinical practice but also in sharing knowledge at optometry seminars and doing paper presentations on various topics of optometry at AIIMS,UMS,Safdarjung etc

In this span of my professional carrier I have been incharge of Contact lenses clinic & Lasik Laser lab at Aiims, New Delhi

I have done projects of WHO and ICMR at Aiims, New Delhi

I also have experience of teaching optometry abroad in multi cultural environment

I have been Examiner of various optometry subject at University of Medical Sciences, Safdarjung

I am in panel of question paper setter of different Optometry subjects in Chatrapati Sahuji Maharaj University, Kanpur

Educational/Professional Qualifications

S No	Professional Qual.	Duration	Year of completion	From
1	M.Optom	2 yrs	2012	Vinayaka Mission University, Tamilnadu
2	BSc (Hons) Ophtha. Tech.	3 yrs	1997	All India Institute of Medical sciences (AIIMS), New Delhi.
3	Cert. in Optical Sales	1year	2011	Medical Research foundation, Shankara Nethralaya, Tamilnadu.
4	Cert. in Contact Lens	Online	2011	Vision Care Institute of Johnson & Johnson Medical Ltd
5	P.G.D.in Hospital Adm.	1year	2001	Young Men Christian Association, New Delhi.
6	MBA	3 yrs	2006	IGNOU, New Delhi.
7	Operation Theatre tech	Short term	1996	All India Institute of Medical sciences (AIIMS), New Delhi.
8	D.Pharm.	2 yrs	1996	Subramania Bharti College of Science & Technology, New Delhi.
		500hrs	1996	Training at Safderjung Hospital, New Delhi.
9	LLB	3 yrs	2017	Ch. Charan Singh University, Meerut,(U.P.).

Work Experience

Presently I am working as an **HOD,Programme Coordinator & Examination coordinator & Assistant Professor,** in Department of Optometry in School of Medical & Allied Sciences, Galgotias University, Greater Noida,(U.P)

Teaching

- Refraction.
- Low Vision Aid,
- Ocular -Anatomy, Physiology, Microbiology, Pathology & Disease
- Systemic condition of eye
- Geriatric and paediatric optometry
- Ophthalmic lenses & Instruments

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Curriculum Vitae

Vikas Shrivastava

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- Systemic condition of eye
- Geriatric and paediatric optometry
- Ophthalmic lenses & Instruments

MD.MOSAIB OMAER

Assistant Professor
Consultant Optometrist

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[illegible]
[illegible] Road[illegible]
[illegible]
[illegible], West Bengal, India
E-mail: [illegible]@gmail.com
Mobile: [illegible]7930[illegible]

OBJECTIVE

[illegible] dedicated teacher with more than 05 years of experience. Committed to acting not only as [illegible] but as a mentor to my students. Ability to listen to students' and parents' concerns and find solutions that ensure students are learning to the best of their abilities. Adapt in a range of teaching methods and able to establish clear objectives for my classrooms.

PROFESSIONAL WORK EXPERIENCE

Fellowship in clinical optometry at L V Prasad Eye Institute (speciality Contact lenses & low vision)	Hyderabad Aug-2010 to July-2011
[illegible] Institute Consultant optometrist – Comprehensive ophthalmology	Moradabad, U.P Oct-2011 to April-2013

TEACHING AND LEADERSHIP POSITIONS

S.K.Gupta School of Optometry (Affiliated with M.J.P.Rohilkhand University, Bareilly, U.P)	Moradabad, U.P
Adjunct Clinical Faculty	May-2014 to April-2016
Assistant Professor designated form	May-2016 to present
Mentor & Trainer for 4th Year optometry intern students & Optometry Fellows with special focus on specialty contact lens treatment, management, and care	May 2014 to Present

ACADEMIC BACKGROUND

DEGREE	:	**Master of Optometry (Part Time)**
YEAR OF PASSING	:	2015
UNIVERSITY	:	**Amity University, Gurgaon, India**
CGPA	:	8.32
DEGREE	:	**Bachelor of Optometry**
YEAR OF PASSING	:	2010
UNIVERSITY	:	**Jamia Hamdard University, New Delhi, India**
PERCENTAGE	:	64%
COURSE	:	**10+2 (Senior Secondary School)**
YEAR OF PASSING	:	2005
BOARD & SCHOOL	:	**CBSE, Aligarh Public School, Aligarh, U.P, India**
PERCENTAGE	:	72%
COURSE	:	**10th (High School)**
YEAR OF PASSING	:	2002
BOARD & SCHOOL	:	**WBBSE, Rehmania Public school, Asansol, W.B, India**
PERCENTAGE	:	77%

Assistant Professor
Consultant Optometrist

Mubee Palace
Rehmat Nagar, RoadNo.04
Durgapur, Pin: 713325
Burdwan, West Bengal, India
E-mail mosso.opt@gmail.com
Mobile : +91-8979307224

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OBJECTIVE:

Dedicated teacher with more than 05 years of experience. Committed to acting not only as a teacher but as a mentor to my students. Ability to listen to students' and parents' concerns and find solutions that ensure students are learning to the best of their abilities. Adapt in a range of teaching methods and able to establish clear objectives for my classrooms.

OPTOMETRY WORK EXPERIENCE

Fellowship in clinical optometry at L V Prasad Eye Institute — **Hyderabad**
(Speciality Contact Lens & low vision) — Aug-2010 to July-2011

C L Gupta Eye institute — **Moradabad, U.P**
Consultant optometrist – Comprehensive ophthalmology — Oct-2011 to April-2013

TEACHING AND LEADERSHIP POSITIONS

C L Gupta School of Optometry — **Moradabad, U.P**
(Affiliated with M.J.P.Rohilkhand University, Bareilly, U.P)
Adjunct Clinical Faculty — May-2014 to April-2016
Assistant Professor designated form — May-2016 to present
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ACADEMIC BACKGROUND

DEGREE	:	Master of Optometry (Part Time)
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UNIVERSITY	:	Amity University, Gurgaon, India
CGPA		8.32
DEGREE		Bachelor of Optometry
YEAR OF PASSING		2010
UNIVERSITY	:	Jamia Hamdard University, New Delhi, India
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COURSE	:	10+2 (Senior Secondary School)
YEAR OF PASSING	:	2005
BOARD & SCHOOL	:	CBSE, Aligarh Public School, Aligarh, U.P, India
PERCENTAGE	:	72%
COURSE	:	10th (High School)
YEAR OF PASSING	:	2002
BOARD & SCHOOL		WBBSE, Rehmania Public school, Asansol, W.B, India
PERCENTAGE		77%

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Experience in Research:

- Outcomes of Optical Penetrating Keratoplasty from a Tertiary Eye care center from Northern India. Completed in 2014 as a part of post-graduation qualification.
- Central corneal thickness Measured with two Optical Devices & Ultrasound Pachometer. Completed in 2015 as a part of post-graduation qualification.
- Interpupillary Distance (IPD) far and near in school and college going students. Completed in 2015 as a part of post-graduation qualification
- Cross-sectional study of the causes of severe visual impairment and childhood blindness among children studying in blind schools in western Uttar Pradesh, India – as a part of my research topic. Currently under peer review process of publication in Indian Journal of Ophthalmology Journal.
- Clinical performance of dispensing spectacles and lens materials and brand in western UP, India, C.L. Gupta Eye Institute, Moradabad -2016.
- Effectiveness of training teachers and aganwadi workers to screen eyes of school going children and pre school going children in Moradabad district of Uttar Pradesh. (presently ongoing)
- Handling optometry research department that include supervision, guiding optometrist, optometry students, fellows & students in choosing, formulating research questionnaire.

Trainings/Workshops completed:

- [illegible] Months Mastermind In-Campus Programme in 2010 Secure 2nd Position [illegible] region
- [illegible] support program - Dispensing Optics at Bhartiya Vidyapeeth University, Pune, from 05th to 16th August 2013
- 2 days, Brien Holden Vision Institute Academy Eye Teach: From Clinician to Educator Workshop scheduled on November 09 – 15 November, 2014.
- 15 days certificate course in project management for eye care services from Lions Aravind institute of community Ophthalmology, Madurai, Year 2014 (1st – 15th Sep.)
- One day workshop on Boston and ROSE K scleral contact lens at L V Prasad Eye Institute, Hyderabad

TEACHING AREA of INTERESTS

1. Dispensing Optics
2. Physical & Physiological Optics
3. Optometric optics
4. Basics & Advance contact Lenses, Low Vision Aids
5. Disease, Ocular Anatomy & Physiology
6. Community Optometry
7. Binocular vision

OPTOMETRY CLINICAL SKILLS:

- Comprehensive eye examination that also include pre- and postoperative care to patients.
- Vision therapy and Low vision rehabilitation
- Contact lens fitting, assessment and dispensing of soft, RGP and toric Lenses and Speciality lenses fittings including Rose-K, Kerasoft IC, Ortho – K, multifocal contact lens and prosthetic contact lens fitting.

northern India. Completed in 2014 as a part of post-graduation qualification.

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- A cross-sectional study of the causes of severe visual impairment and childhood blindness among children studying in blind schools in western Uttar Pradesh, India - as a part of my research topic, currently under peer review process of publication in Indian Journal of Ophthalmology journal.
- Pattern of prescribing spectacles and lens materials and brand in western U.P, India, C L Gupta Eye Institute, Moradabad -2016.
- Effectiveness of using teachers and aganwadi workers to screen eyes of school going children and preschool going children in Moradabad district of Uttar Pradesh. (presently under going)
- Heading optometry research department that include supervision, guiding optometrist, optometry interns, fellows & students in choosing, formulating research questionnaire.

Trainings/Workshops completed:

- Bausch &Lomb 3months Mastermind In-Campus Programme in 2010 Secure 2nd Position in Delhi region.
- Faculty Support program - Dispensing Optics at Bhartiya Vidyapeeth University, Pune, from 05th to 16th August 2013
- 3 days, Brien holden Vision Institute Academy Eye Teach: From Clinician to Educator Workshop scheduled on November 09 – 15 November, 2014.
- 15 days certificate course in project management for eye care services from Lions Aravind institute of community Ophthalmology, Madurai, Year 2014 (1st – 15th Sep.)
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TEACHING AREA of INTERESTS

1. Dispensing Optics
2. Physical & Physiological Optics
3. Optometric Optics
4. Basic & Advance Contact Lenses, Low Vision Aids
5. Diseases, Ocular Anatomy & Physiology
6. Community Optometry
7. Binocular vision

OPTOMETRY CLINICAL SKILLS:

- Comprehensive eye examination that also include pre- and postoperative care to patients.
- Vision therapy and Low vision rehabilitation
- Contact lens fitting, assessment and dispensing of soft, RGP and toric Lenses and Speciality lenses fitting, including Rose-K, Kerasoft IC, Ortho – K, multifocal contact lens and prosthetic contact lens fitting.

- Computer LASIK work-up.
- Pentacam HR A, Corneal Topography, Keratometry (automated & manual), A-Scan, B-Scan, Tonometry, Feldman Applanation Tonometry, FFA, fundus Photo graphy etc.

PRESENTATIONS in conferences:

- Invited as a faculty to talk on Contact lens fitting in Pediatric Aphakia – Harmony CME in [illegible]
- Oral presentation on "Central Corneal thickness measured with two optical devices and Goldmann tonometer in Pt on 2020 national conference – 2015
- Invited as a faculty in DRISHTICON IPSOS Mid Term conference to give talk on Dispensing Progressive Lenses at SRMS university, Bareilly
- Oral presentation in World Congress Optometry on topic " A cross sectional study of the causes of severe visual impairment and childhood blindness among children studying in Special schools in western Uttar Pradesh, India" at Hyderabad in October-2017

EXTRA CURRICULUR ACTIVITIES:

- Represented Jamia Hamdard University in inter university cricket tournament in the year [illegible]
- Actively participated in several sports event (cricket, football and athletics) both in schools and college levels.
- Actively participated in several onstage and offstage events for arts day, republic day, and [illegible] on school and college level.

REFERENCES:

- Dr Kamal Pant, Associate Professor & Head – Department of Optometry, faculty of Paramedical Sciences, U.P. University of Medical Sciences, Etawah, U.P, E-mail id: kamalpant007@rediffmail.com , Contact No.: +97-9458505810
- Ms Garima Singh, HR Head, C L Gupta Eye Institute, Moradabad, India, E-mail id: [illegible]@clgei.org , Contact No.: +91-9557737869

MEMBERSHIP:

- Optometry Council of India (OCI)
  - Registration Number: 062015748

PASSPORT DETAILS:

- Passport Number: M8585963
- Date of Issue: 29-05-2015 Date of Expiry: 28-05-2025

DECLARATION:

I hereby solemnly declare that all the details furnished above are true to the best of my knowledge and I bear the responsibility of the correctness of the above mentioned particulars.

Date: 11-05-2018
Place: Moradabad

Mosaib Omaer
Md.Mosaib Omaer

Pachymetry, Goldman Applanation Tonometry, FFA, fundus Photo graphy etc.

PRESENTATIONS in Conferences:

- Invited as a faculty to talk on Contact lens fitting in Pediatric Aphakia – Harmony CME in 2013
- Poster presentation on "Central Corneal thickness measured with two optical devices and US pachometer" in Vision 2020 national conference – 2015
- Invited as a faculty in DRISHTICON UPSOS Mid Term conference to give talk on Dispensing Progressive Lenses at SRMS university, Bareilly
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- Represented Jamia Hamdard University in inter university cricket tournament in the year 2007
- Actively participated in several sports event (cricket, football and athletics) both in schools and college levels.
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REFRENCES:

1. Dr.Kamal Pant, Associate Professor & Head – Department of Optometry, faculty of Paramedical Sciences, U.P. University of Medical Sciences, Etawah, U.P, E-mail id: [illegible]@[illegible]redifmail.com, Contact No.: +97-9458505810
2. [illegible] Sinha Singh, HR Head, C L Gupta Eye Institute, Moradabad, India, E-mail id: [illegible], Contact No.: +91-9557737869

MEMBERSHIP:

- Optometry Council of India (OCI)
  - Registration Number: 062015748

[illegible] DETAILS:

[illegible] Number: M8585963

[illegible] 2015 Date of Expiry: 28-05-2025

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I [illegible] solemnly declare that all the details furnished above are true to the best of my knowledge and I bear the responsibility of the correctness of the above mentioned particulars.

Date: 11-05-2018

Place: Moradabad

Mosaib Omaer

Md.Mosaib Omaer