SHRI
DHARMASTHALA
MANJUNATHESHWARA
UNIVERSITY

Ordinance Governing
BDS Degree Course Year I
Curriculum 2019-20

Amended up to November, 2022

SHRI DHARMASTHALA MANJUNATHESHWARA UNIVERSITY

(A State Private University established under the Shri Dharmasthala Manjunatheshwara University
Act No 19 of 2018 of Government of Karnataka and Notification No. ED 261 URC 2018 dated 19th December 2018)

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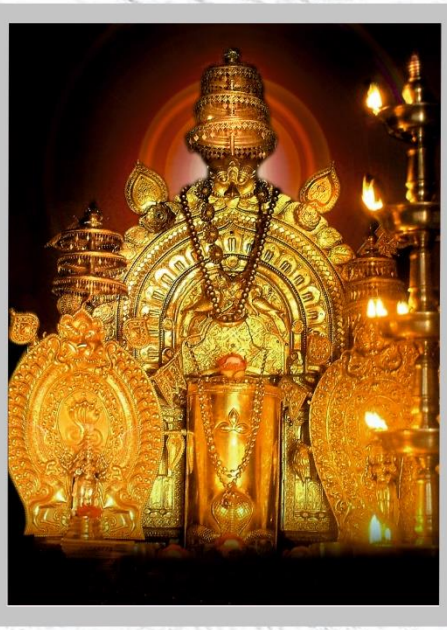
|| Om Shri Manjunathaya Namaha ||



Shree Kshethra Dharmasthala

Edition Year : 2019-20

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THE LOGO

Poojya Dr D. Veerendra Heggade, Hon'ble Chancellor of the University, while searching for an appropriate Logo for the University, saw a photograph picked from Temple Architecture showing Wings of a Bird, sculpted in Indian style and wanted it to be incorporated in the logo for the University, as the Wings symbolize 'Spreading of Knowledge beyond Boundaries'. Further it was felt that the Central theme of the logo should be 'Rudra' (The Linga) with three wings on each side. In this way, the logo of the University was conceptualized.

Hence:

1. The central part represents **Rudra** who Demolishes Darkness.
2. The Three **horizontal lines on The Linga** stand for Samyak Darshan (Right Belief), Samyak Gyan (Right Knowledge) and Samyak Charitra (Right Conduct).
3. The **Wings** symbolize spreading of Knowledge across the boundaries.
4. Base line **"Truth Liberates"** highlights the Purpose of Education: to liberate oneself unconditionally. It shows that it is not discipline, nor knowledge nor the efforts to freedom that liberate but Truth is what liberates you from all your conditioning and ignorance.

The overall significance of Shri Dharmasthala Manjunatheshwara University's Logo is:

Darkness of ignorance is destroyed by the flow of knowledge to bring Liberty to everyone, by realizing the truth. And, it should spread globally without the boundaries as hindrance.

SHRI
DHARMASTHALA
MANJUNATHESHWARA
UNIVERSITY

TRUTH LIBERATES

VISION

Shri Dharmasthala Manjunatheshwara University will set the highest standards of teaching and learning by awakening the intelligence of the students and nurturing the creativity hidden in them by creating an environment where the ancient wisdom blends with modern science, to transform them into whole human beings to face the challenges.

MISSION

- To ensure that the journey of education is inspiring, pleasant and enjoyable.
- Attract the best of teachers and students.
- Achieve high principles of trust, love and spirituality in the students.
- Create a collaborative, diverse and exclusive community.
- Transform the student of today to be a leader of tomorrow and a better human being.
- Produce passionate teachers.
- Evolve innovative teaching techniques.
- Create a peaceful environment.
- Prepare the student to face the social challenges.
- Create a University of which the Nation is proud of.
- Be an effective partner in Nation Building.
- Create an Eco-friendly University.
- Create a University based on the principles of beauty, love and justice.

||Om Shanti! Om Shanti! Om Shanti||

SHRI
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SDMU/ACD/F-4/Notif-219(A1)/669/2021

Date: 28-12-2021

NOTIFICATION

Amendment in the Ordinance Governing Curricula of BDS Year I

Ref:
1. Shri Dharmasthala Manjunatheshwara University Act 2018 (Karnataka Act 19 of 2018)
2. Notification on Ordinance Governing Curricula of Dental Subjects in BDS I year – 2019 (Ref No. SDMU/ACD/DEN/CRM/368/2019 Dated: 27-07-2019)
3. Minutes of the 5th Meeting of Academic Council (Ref. No. SDMU/AC/M5/F-28/626/2021 Dated: 10-12-2021)
4. Minutes of the 5th Meeting of Board of Studies - Dental UG held on 07.07.2021

In exercise of the powers under Sec 1.4 (Powers and functions- Para ix & x). & 1.8 (Powers and functions- Para i) of Shri Dharmasthala Manjunatheshwara University, Approval of the Academic Council of Shri Dharmasthala Manjunatheshwara University is hereby accorded for the Amendment of the Ordinance Governing Revised Curricula of BDS year I as below, with effect from the date of notification.

Deletion	Page No.43, (k) Re-totalling
	~~(k) Re-totalling~~ ~~The University on application and remittance of a stipulated fee to be prescribed by the university shall permit a c recounting or opportunity to recount the marks received for various questions in an answer paper/papers for theory o all subjects for which the candidates has appeared in the university examination. Any error in addition of the marks awarded if identified should be suitably rectified.~~
Addition	Page No.43, (k) RESIT examination
	Amended as below: (k) RESIT examination: Those candidates who fail in the university annual examinations can re-appear for the RESIT examination. The RESIT examination will be held within 90 days from the date of announcement of results of the annual examination. Those who fail in the RESIT examination will have to appear with their junior batch next year.

Lt. Col. U. S. Dinesh (Retd.)
REGISTRAR
REGISTRAR,
Shri Dharmasthala Manjunatheshwara
University, Dharwad

Shri Dharmasthala Manjunatheshwara University * Dharwad *

To: The Principal, SDM College of Dental Sciences & Hospital.

Copy for information to:
1. Hon'ble Chancellor, Shri Dharmasthala Manjunatheshwara University, Dharwad
2. Vice Chancellor - Shri Dharmasthala Manjunatheshwara University.
3. Pro Vice-Chancellor (Academics) - Shri Dharmasthala Manjunatheshwara University.
4. Controller of Examinations, Shri Dharmasthala Manjunatheshwara University.
5. Chairperson, Board of Studies - Dental UG
6. University Office for Records File
7. Office of the Registrar

* This Ordinance is amended as per Notification No.SDME/F-4/Notif-219(A1)/ /2022 dated 12.11.2022

CONTENTS

11. General Surgery
12. Conservative Dentistry and Endodontics
13. Oral & Maxillofacial Surgery
14. Oral Medicine and Radiology
15. Orthodontics & Dentofacial Orthopedics
16. Pediatrics & Preventive Dentistry
17. Public Health Dentistry
18. Periodontology
19. Prosthodontics and Crown & Bridge
20. Aesthetic Dentistry
21. Forensic Odontology
22. Oral Implantology
23. Behavioral Science
24. Ethics

GOALS AND OBJECTIVES

1. **Goals:**
   a. The dental graduates during training in the institutions should acquire adequate knowledge, necessary skills and reasonable attitudes which are required for carrying out all activities appropriate to general dental practice involving the prevention, diagnosis and treatment of anomalies and diseases of the teeth, mouth, jaws and associated tissues.
   b. The graduate also should understand the concept of community oral health education and be able to participate in the rural health care delivery programmes existing in the country.

2. **Aims and Objectives:**
   The general aim is "Oral health for General health".

   a. To foster excellence in education, research and patient care.
   b. To promote the study and dissemination of knowledge regarding the medical aspects of dentistry while serving the best interests of the public.
   c. To promote the highest standards of oral health care.
   d. To provide an avenue of referral for dental practitioners who have patients with severe, life threatening medical disorders or complex diagnostic problems involving the oral and maxillofacial region that requires management.
   e. To improve the quality of life of patients with medically-related oral diseases.
   f. To focus and educate on the latest investigative modalities and its applications in dentistry.
   g. To control and prevent the dental/oral diseases and promoting oral health through organized community efforts.

The objectives are dealt under three headings (a) Knowledge and understanding (b) skills and (c) Attitudes.

a. Knowledge and Understanding:
The graduate should acquire the following during the period of training.

i. Adequate knowledge of the scientific foundations on which dentistry is based and good understanding of various relevant scientific methods, principles of biological functions and is able to evaluate and analyze scientifically various established facts and data.

ii. Adequate knowledge of the development, structure and function of the teeth, mouth and jaws and associated tissues both in health and disease and their relationship and effect on general state of health and also bearing on physical and social wellbeing of the patient.

iii. Adequate knowledge of clinical disciplines and methods which provide a coherent picture of anomalies, lesions and diseases of the teeth, mouth and jaws and preventive diagnostic and therapeutic aspects of dentistry.

iv. Adequate clinical experience required for general dental practice.

v. Adequate knowledge of the constitution, biological function and behavior of persons in health and sickness as well as the influence of the natural and social environment on the state of health in so far as it affect dentistry.

b. Skills:

A graduate should be able to demonstrate the following skills necessary for practice of dentistry.

i. Able to diagnose and manage various common dental problems encountered in general dental practice keeping in mind the expectations and the right of the society to receive the best possible treatment available wherever possible.

ii. Acquire the skill to prevent and manage complications if encountered while carrying out various surgical and other procedures.

iii. Possess skill to carry out certain investigative procedures and ability to interpret laboratory findings.

iv. Promote oral health and help prevent oral diseases where possible.

v. Competent in the control of pain and anxiety among the patients during dental treatment.

c. Attitudes:

A graduate should develop during the training period the following attitudes.

i. Willing to apply the current knowledge of dentistry in the best interest of the patients and the community.

ii. Maintain a high standard of professional ethics and conduct and apply these in all aspects of professional life.

iii. Seek to improve awareness and provide possible solutions for oral health problems and needs throughout the community.

iv. Willingness to participate in the Physical Education Programmes to update the knowledge and professional skill from time to time.

v. To help and participate in the implementation of the National Oral Health policy.

3. General outline of BDS Degree course:

a. The undergraduate course involves organization of teaching program year-wise. However, this course, as a whole, should demonstrate integration of the basic sciences, clinical dentistry and practical or the laboratory skills. The course should be designed and integrated in such a way to permit smooth progression from pre-clinical to clinical phase. Collaboration should been courage between teachers of basic sciences, dental sciences and clinical subjects.

b. The undergraduate dental course consists of three main components. The first component consists of subjects common to medicine and dentistry like Anatomy, Physiology, Biochemistry and Behavioral science, leading to Pharmacology, Pathology, Microbiology and then on to General medicine and General surgery. The second component runs concurrently with the first and deals with special aspects of oral and dental tissues, Oral Biology and Oral Pathology. Finally, the third component based on the foundations of the first two, deals with the clinical and technical aspects of dentistry as is required for general dental practice.

c. The first component of the course is intended to provide initially, an appreciation of normal human structure, development, function and behavior, leading to understanding of the diseases, its prevention and treatment. The main objective is to provide the student a broad knowledge of the normal structures and functions of the body, the alterations which take place in disease with particular reference to those conditions in which medical and dental co-operation is essential for proper management. At this stage, the student should also be made aware of the social and psychological aspects of patient care with special reference to the relationship between dentist and patient. The behavioral sciences including both Sociology and Psychology should be introduced at the initial stages of the training programme, much before the students actually deal with the patients.

d. The second component of dental undergraduate programme consist instruction in the subjects dealing with dental and oral aspects to ensure a detailed knowledge of the structure and function of the dental and oral tissues. This enables the student to diagnose, prevent and treat the dental and oral diseases and disorders which were not included in the first component. The subject of Oral Biology is to be introduced at this level to provide the students a comprehensive knowledge and application of Oral Physiology, Microbiology, Biochemistry and Oral Immunology. Students should be exposed to the basic aspects of Forensic Odontology at this stage of the course along with Oral Biology / Oral Pathology.

e. The third component of the course comprising the clinical and technical aspects of dentistry actually prepares the student to undertake total oral and dental health care of the patients of all ages. The emphasis at this stage should be on the prevention of the various dental diseases and how to preserve natural teeth with their supporting structures. The importance of the various preventive methods needs to be stressed. The significance of diagnosis of various dental and oral problems needs to be emphasized along with treatment planning before actual treatment procedures are undertaken. In addition to acquiring the knowledge, the students need to gain adequate clinical hands-on experience in extractions and other minor oral surgical procedures, all aspects of Conservative Dentistry, Endodontic, Crown and Bridge, Provision of partial and complete dentures, various periodontal therapeutic procedures and use of removable orthodontic appliances. Familiarity with various radiological

techniques, particularly intra-oral methods and proper interpretation of the radiographs, is an essential part of this component of training and has application in clinical diagnosis, forensic identification and age estimation. Towards the final stage of the clinical training, each student should be involved in comprehensive oral health care or holistic approach to enable them to plan and treat patients as a whole, instead of piece-meal treatment provided in each specialty. Shri Dharmasthala Manjunatheshwara University provides all the facilities and required infrastructure to the fullest as recommended by Dental Council of India. The aim of the undergraduate program should undoubtedly be to produce a graduate, competent in general dental practice.

f. The commitment towards the society as a whole needs to be stressed along with the knowledge and treatment skills gained. Instruction in Public health dentistry should emphasize the sociological aspects of health care particularly oral health care, including the reasons for the variation in oral and dental needs of different sections of the society. It is important to know the influence of the social, behavioral, environmental and economic factors on oral and dental health. Students should be made aware of the National oral health Policy and the importance of being a member of the Health care team delivering medical and oral health care particularly among rural population.

g. Scientific advancement of any profession is based largely on continuous research activities. Dentistry is no exception. Shri Dharmasthala Manjunatheshwara University provides adequate facility towards research for the faculty and students.

h. Inter-disciplinary research should be encouraged to bring in integration among various specialties. The teaching and training methodology should be such that the students are motivated to think and indulge in self-study rather than playing a passive role. Provision should be made in the daily schedules for adequate time for reading. Proper library facilities with adequate timings and seating capacity are made available along with adequate audio visual aids, like video tapes, computer assisted learning aids, Medline and internet facilities to encourage self-study. Students should be encouraged to participate in simple research project work and the system of electives. Spending some stipulated amount of time in another dental college within the country or outside is given a serious consideration.

i. The society has a right to expect high standards and quality of treatment. Hence, it is mandatory and a social obligation for each dental surgeon to upgrade his or her knowledge and professional skills from time to time. In view of the Dental Council of India recommendation Shri Dharmasthala Manjunatheshwara University provides facilities and proper infrastructure to conduct the continuous professional education programmes in dentistry to enable the practitioners to update their knowledge and skills. In addition, the practitioners are encouraged to attend conferences of state and national level, workshops, seminars and any other such activity which is suitable to upgrade the knowledge and skills.

j. The undergraduate curriculum should stress the significance of infection and cross- infection control in dental practice. Aspects like sources of infection, measures to be adopted both general and specific for control particularly the HIV and hepatitis should be properly incorporated into the curriculum so that the graduates are aware of its significance and follow it in their practice.

k. The information technology has touched every aspect of an individual's personal and professional life. The Shri Dharmasthala Manjunatheshwara University hence recommends that all undergraduates acquire minimum computer proficiency which will enable them to enhance their professional knowledge and skills.

4. BDS Degree – Course of study:

a. The undergraduate dental training programme leading to B.D.S. degree shall be a minimum of five years duration. During this period, the students shall be required to engage in full time study of which the instruction in clinical subjects should be at least for three years at a dental college recognized or approved by the Dental Council of India

b. Basic Medical & Dental Subjects: The basic Medical and Dental sciences comprise Anatomy gross and microscopic, Physiology, Biochemistry, Pharmacology, Oral biology and Science of Dental Materials. Subjects like behavioral sciences, which is useful to develop communication skills, should also be introduced in the first year itself and spread over the undergraduate

course. An introduction to Public Health Dentistry& Preventive Dentistry also will be useful to develop the concept of commitment to community. The laboratory skills to be developed by the students like pre-clinical Prosthodontics, Crown Bridge, Aesthetic Dentistry and Oral Implantology exercises and studying dental morphology also is a part of initial training. The instruction in the above medical and dental sciences shall be for two years duration. At the end of this period the student should be in a position to understand and comprehend in general the development, structure and function of the human body in both health and disease.

c. The instruction in basic dental sciences should include theoretical and practical aspects of oral anatomy and physiology, to provide a detailed knowledge of the form and structure of teeth associated tissues and occlusal relationships. The study should also aim at development of a concept regarding physiological and biochemical processes relevant to oral cavity for better understanding of the changes which occur with the onset of disease in the oral cavity. The student should be made aware of the importance of various dental tissues in forensic investigation.

d. Clinical, Medical and Dental subjects: The students should be introduced to clinics in the initial stage, preferably in the first year, as an observer to familiarize with clinical set-up and working. The period of instruction in the clinical subjects shall be not less than three years full time. During this, the student shall attend a dental hospital, general hospital, community camps and satellite clinics, in order to obtain instruction and experience in the practice of dentistry. The main objective of training in clinical dental subjects is to produce a graduate able and competent to recognize or diagnose various dental and oral diseases, to undertake general dental treatment, advice on the provision of specialized treatment available and finally advise the patient on prevention. The student should also understand the relationship between oral and systemic diseases.

e. The general medicine and surgery training should provide sufficient knowledge on human disease to enable the student to understand its manifestations as relevant to the practice of dentistry. This requires clinical teaching on patients and shall be carried out in in-patient and outpatient medical departments and specialist clinics. This clinical instruction should enable the student to

understand and perhaps diagnose common systemic diseases which have relevance to dental practice, by adopting a systematic approach of history taking and clinical examination. The student should also realize the significance of various general and special investigations in the diagnosis of diseases. The ability to recognize physical and mental illness, dealing with emergencies, effective communication with patients, and interaction with various professional colleges also becomes important aspect of this training.

f. Shri Dharmasthala Manjunatheshwara University considers it important for all dental students to receive instructions in first-aid and principles of cardio-pulmonary resuscitation. It is also desirable that the student spend time in an accident and emergency department of a general hospital.

g. The purpose of the clinical training is to provide sufficient practical skill in all aspects of clinical dentistry. The instruction should also include patient management skills, treatment of patients of all ages with special reference to children (pediatric), very elderly (geriatric), medically compromised and disabled patients.

h. During the three years clinical course, the students should receive thorough instruction which involves history taking, diagnosis and treatment planning in all aspects of dentistry and should be competent on graduation to carry out all routine general procedures. In Oral & Maxillofacial Surgery and Oral Implantology, instruction should include the knowledge of various maxillofacial problems like injuries, infections and deformities of the jaws and associated structures. The clinical experience should include those procedures commonly undertaken in general practice like extraction of teeth, minor oral surgical procedure etc. In Conservative, Endodontics & Aesthetic Dentistry, Prosthodontics, Crown Bridge, Aesthetic Dentistry and Oral Implantology and Periodontology and Oral Implantology students should be competent on graduation to carry out routine treatment like restorations of various kinds, endodontic procedures, removable and fixed prosthodontics, concept of Osseo integration and finally various kinds of periodontal therapy. In addition, students should be aware of their limitations on graduation, need to refer patients for consultant opinion and/or treatment and also the need for postgraduate and continuous education programmes. In Orthodontics & dent facial Orthopedics, students should carry out simple appliance therapy for

patients. Students should also be able to appreciate the role of dento facial growth in the development and treatment of malocclusion. In Pediatric dentistry, the students should concentrate on clinical management, efficacy of preventive measures, treatment needs particularly for children with disabilities. In oral medicine and oral diagnosis, the student should receive instruction in various lesions, occurring in the oral cavity with particular reference to oral cancer.

i. The successful control and management of pain is an integral part of dental practice. Upon graduation the students should be competent to administer all forms of local anesthesia. The value of behavioral methods of anxiety management should be emphasized. The student should also have the practical experience in the administration of intra-muscular and intravenous injections. Knowledge of pain mechanisms and strategies to control post-operative pain is essential for practice of dentistry.

j. Instructions are given in dental jurisprudence, legal and ethical obligations of dental practitioners and the constitution and functions of Dental Council of India.

k. Infection and cross infection control assume significance in dental practice. The students should be made aware of the potential risk of transmission in the dental surgery, various infectious diseases particularly HIV and hepatitis. The students should be aware of their professional responsibility for the protection of the patients, themselves and their staff and the requirements of the health and safety regulations.

l. In the recent times, the subjects of Esthetic Dentistry, Oral Implantology, Behavioural sciences and Forensic odontology have assumed great significance. Hence, Shri Dharmasthala Manjunatheshwara University has incorporated these four specialties into the undergraduate curriculum as per the Council recommendation. The instruction and clinical training in aesthetic dentistry shall be carried out by the Departments of Conservative and Endodontics, Prosthodontics and Crown Bridge and Oral Implantology. Similarly, the instruction and clinical training in Oral Implantology is done by the Departments of Prosthodontics & Crown Bridge, Oral Implantology, Oral & Maxillofacial Surgery and Periodontology & Oral Implantology. The instruction

in behavioural sciences should ideally commence before the students come in contact with the patients and shall be carried out by the Departments of Public Health Dentistry & Preventive Dentistry and Pedodontics & Preventive Dentistry. Forensic Odontology will be a part of Oral Pathology & Oral Microbiology and Oral Medicine & Radiology.

5. Subjects of Study:

1 BDS

1. Human Anatomy, Embryology, Histology & Medical Genetics
2. Human Physiology & Biochemistry, Nutrition & Dietetics
3. Dental Anatomy, Embryology and Oral Histology
4. Dental Materials
5. Pre-Clinical Prosthodontics and Crown & Bridge

II BDS

1. General Pathology & Microbiology
2. General and Dental Pharmacology and Therapeutics
3. Dental Materials
4. Pre-Clinical Conservative Dentistry Laboratory Exercises
5. Pre-Clinical Prosthodontics and Crown & Bridge
6. Oral Pathology & Oral Microbiology

III BDS

1. Oral Pathology & Oral Microbiology
2. General Medicine
3. General Surgery
4. Conservative Dentistry and Endodontics
5. Oral & Maxillofacial Surgery
6. Oral Medicine and Radiology
7. Orthodontics & Dentofacial Orthopaedics
8. Paediatric & Preventive Dentistry
9. Public Health Dentistry
10. Periodontology
11. Prosthodontics and Crown & Bridge

IV BDS

1. Conservative Dentistry and Endodontics
2. Oral & Maxillofacial Surgery
3. Oral Medicine and Radiology
4. Orthodontics & Dentofacial Orthopaedics
5. Paediatric & Preventive Dentistry
6. Public Health Dentistry
7. Periodontology
8. Prosthodontics and Crown & Bridge

The following provision has been inserted in terms of (6th Amendment) notification published on 24.6.2013 in the Gazette of India:-

Revised BDS Course (4th Amendment) Regulations, 2011, shall be deemed at par/equivalent with 4+1 year BDS Course, including one year Paid Rotatory Internship programme, for all interns and purposes i.e. for admission in MDS Course, applying for Govt Jobs, registration in State Dental Councils etc.

The following has been substituted in terms of (3rd Amendment) notification published on 25th August, 2011in the Gazette of India and the same is as under: -

6. Minimum Working Hours for Each Subject of Study

Table 1

Subjects and Hours for B.D.S Course

Sr. No	Subject	Lecture Hours	Practical Hours	Clinical Hours	Total Hours
1	General Human Anatomy including Embryology, Osteology and Histology	100	175		275
2	General Human Physiology, Biochemistry, Nutrition and Dietetics	120 70	60 60		180 130
3	Dental Anatomy, Embryology, and Oral Histology	80	240		320
4	Dental Materials	105	250		355
5	Dental Pharmacology and Therapeutics	70	20		90
6	General Pathology & Microbiology	55 65	55 50		110 115
7	General Medicine	60		90	150
8	General Surgery	60		90	150
9	Oral Pathology and Microbiology	145	130		275
10	Oral Medicine and Radiology	65		170	235

11	Pediatric& Preventive Dentistry	65		170	235
12	Orthodontics & Dental orthopedics	50		170	220
13	Periodontology	80		170	250
14	Oral & Maxillofacial Surgery	70		270	340
15	Conservative Dentistry and Endodontics	135	200	370	705
16	Prosthodontics & Crown & Bridge	135	300	370	805
17	Public Health Dentistry	60		200	260
	Total	**1590**	**1540**	**2070**	**5200**

Note: There should be minimum of 240 Teaching days each academic year consisting of 8 working hours, including one hour of lunch break.
Internship- 240x8 hours = 1920 clinical hours.

Working Hours for Each Subject of Study (B.D.S Course)

Table II

Working Hours for I B.D.S

Sr. No.	Subject	Lecture Hours	Practical Hours	Clinical Hours	Total Hours
1	General Human Anatomy including Embryology, Osteology and Histology	100	175		275
2	General Human Physiology,	120	60		180
3	Biochemistry, Nutrition and Dietetics	70	60		130
4	Dental Anatomy, Embryology, and Oral Histology	105	250		355
5	Dental Materials	20	40		60
6	Pre-clinical Prosthodontics & crown & bridge		100		100
	Total	**415**	**685**		**1100**

Table III
Working Hours for II B.D.S

Sr.No	Subject	Lecture Hours	Practical Hours	Total Hours
1	Dental Pharmacology and Therapeutics	70	20	90
2	General Pathology	55	55	110
3	Microbiology	65	50	115
4	Dental Materials	60	200	260
5	Oral Pathology and Microbiology	25	50	75
6	Pre-clinical Prosthodontics & crown & bridge	25	200	225
7	Pre-clinical conservative dentistry	25	200	225
	Total	**325**	**775**	**1100**

Table IV

Working Hours for III B.D.S

Sr. No.	Subject	Lecture Hours	Practical Hours	Clinical Hours	Total Hours
1	General Medicine	60		90	150
2	General Surgery	60		90	150
3	Oral Pathology and Microbiology	120	80		200
4	Oral Medicine and Radiology	20		70	90
5	Pediatric& Preventive Dentistry	20		70	90
6	Orthodontics & Dental orthopedics'	20		70	90
7	Periodontology	30		70	100
8	Oral & Maxillofacial Surgery	20		70	90
9	Conservative Dentistry and Endodontics	30		70	100
10	Prosthodontics & Crown & Bridge	30		70	100
	Total	**410**		**750**	**1160**

The following has been substituted in terms of (3rd Amendment) notification published on 25th August, 2011 in the Gazette of India and the same is as under:-

Table V
Working Hours for IV B.D.S

Sr. No	Subject	Lecture Hours	Practical Hours	Clinical Hours	Total Hours
1	Orthodontics & Dental orthopedics	80		100	130
2	Oral Medicine and Radiology	45		100	145
3	Pediatric& Preventive Dentistry	45		100	145
4	Periodontology	50		100	150
5	Oral & Maxillofacial Surgery	50		200	250
6	Conservative Dentistry and Endodontics	80		300	380
7	Prosthodontics & Crown & Bridge	80	100	300	380
8	Public Health Dentistry	60		200	260
	Total	**440**		**1400**	**1840**

Note:
The following footnote has been modified as under in terms of (3rd Amendment) notification published on 25th August, 2011 in the Gazette of India:-

* *Behavioral Sciences Classes shall commence in first year.*
* *Forensic odontology shall be covered in the department of Oral pathology and Oral Medicine during third year.*
* *Esthetic Dentistry shall be covered in the Departments of Conservative Dentistry and Prosthodontics during fourth year.*
* *Oral Implantology shall be covered in the Department of Maxillofacial Surgery, Prosthodontics &Crown & Bridge and Periodontology during fourth year.*
* *Ethics and dental jurisprudence shall be covered in Public Health Dentistry in fourth year.*

7. Competencies

At the completion of the undergraduate training programme the graduates shall be competent in the following:

General Skills

a. Apply knowledge & skills in day to day practice.
b. Apply principles of ethics.
c. Analyze the outcome of treatment.
d. Evaluate the scientific literature and information to decide the treatment.
e. Participate and involve in professional bodies.
f. Self-assessment & willingness to update the knowledge & skills from time to time.
g. Involvement in simple research projects.
h. Minimum computer proficiency to enhance knowledge and skills.
i. Refer patients for consultation and specialized treatment.
j. Basic study of forensic odontology and geriatric dental problems.

Critical Thinking

Graduates must be competent to:

a. Evaluate and integrate emerging trends in health care as appropriate.
b. Utilize critical thinking and problem-solving skills.
c. Evaluate and integrate best research outcomes with clinical expertise and patient values for evidence-based practice.

Professionalism

Graduates must be competent to:

a. Apply ethical and legal standards in the provision of dental care.
b. Practice within one's scope of competence and consult with or refer to professional colleagues when indicated

Communication and Interpersonal Skills

Graduates must be competent to:

a. Apply appropriate interpersonal and communication skills.
b. Apply psychosocial and behavioral principles in patient-centered health care.
c. Communicate effectively with individuals from diverse populations.

Practice Management and Informatics

Graduates must be competent to:

a. Evaluate and apply contemporary and emerging information including clinical and practice management technology resources.
b. Evaluate and manage current models of oral health care management and delivery.
c. Apply principles of risk management, including informed consent and appropriate record keeping in patient care.
d. Demonstrate effective business, financial management, and human resource skills.
e. Apply quality assurance, assessment, and improvement concepts.
f. Comply with local as well as international regulations (e.g. OSHA and HIPAA of USA).
g. Develop a catastrophe preparedness plan for the dental practice.

Patient Care

Assessment, Diagnosis, and Treatment Planning

Graduates must be competent to:

a. Manage the oral health care of the infant, child, adolescent, and adult, as well as the unique needs of women, geriatric and special needs patients.
b. Prevent, identify, and manage trauma, oral diseases, and other disorders.
c. Obtain and interpret patient / medical data, including a thorough intra / extra oral examination, and use these findings to accurately assess and manage all patients.
d. Select, obtain, and interpret diagnostic images for the individual patient.
e. Recognize the manifestations of systemic disease and how the disease and its management may affect the delivery of dental care.
f. Formulate a comprehensive diagnosis, treatment, and/or referral plan for the management of patients.

Health Promotion

Graduates must be competent to:

a. Provide prevention, intervention, and educational strategies.
b. Participate with dental team members and other health care professionals in the management and health promotion for all patients.
c. Recognize and appreciate the need to contribute to the improvement of oral health beyond those served in traditional practice settings.

Establishment and Maintenance of Oral Health

Graduates must be competent to:

a. Utilize universal infection control guidelines for all clinical procedures.
b. Prevent, diagnose, and manage pain and anxiety in the dental patient.
c. Prevent, diagnose, and manage temperomandibular joint disorders.
d. Prevent, diagnose, and manage periodontal diseases.
e. Develop and implement strategies for the clinical assessment and management of caries.
f. Manage restorative procedures that preserve tooth structure, replace missing or defective tooth structure, maintain function, are esthetic, and promote soft and hard tissue health.
g. Diagnose and manage developmental or acquired occlusal abnormalities.
h. Manage the replacement of teeth for the partially or completely edentulous patient.
i. Diagnose, identify, and manage pulpal and periradicular diseases.
j. Diagnose and manage oral surgical treatment needs.
k. Prevent, recognize, and manage medical and dental emergencies.
l. Recognize and manage patient abuse and/or neglect.
m. Recognize and manage substance abuse.
n. Evaluate outcomes of comprehensive dental care.
o. Diagnose, identify, and manage oral mucosal and osseous diseases.

Oral Medicine & Radiology

a. Able to identify precancerous and cancerous lesions of the oral cavity and refer to the concerned specialty for their management.
b. Should have an adequate knowledge about common laboratory investigations and interpretation of their results.
c. Should have adequate knowledge about medical complications that can arise while treating systemically compromised patients and take prior precautions/ consent from the concerned medical specialist.
d. Have adequate knowledge about radiation health hazards, radiations safety and protection.
e. Competent to take intra-oral radiographs and interpret the radiographic findings.
f. Gain adequate knowledge of various extra-oral radiographic procedures, TMJ radiography and sialography.

g. Be aware of the importance of intra- and extra-oral radiographs in forensic identification and age estimation.
h. Should be familiar with jurisprudence, ethics and understand the significance of dental records with respect to law.

Pediatric & Preventive Dentistry

a. Able to instill a positive attitude and behavior in children towards oral health and understand the principles of prevention and preventive dentistry right from birth to adolescence.
b. Able to guide and counsel the parents in regards to various treatment modalities including different facets of preventive dentistry.
c. Able to treat dental diseases occurring in child patient.
d. Able to manage the physically and mentally challenged disabled children effectively and efficiently, tailored to the needs of individual requirement and conditions.

Orthodontics & Dentofacial Orthopedics

a. Understand about normal growth and development of facial skeleton and dentition.
b. Pinpoint aberrations in growth process both dental and skeletal and plan necessary treatment.
c. Diagnose the various malocclusion categories.
d. Able to motivate and explain to the patient (and parent) about the necessity of treatment.
e. Plan and execute preventive orthodontics (space maintainers or space regainers).
f. Plan and execute interceptive orthodontics (habit breaking appliances).
g. Manage treatment of simple malocclusion such as anterior spacing using removable appliances.
h. Handle delivery and activation of removable orthodontic appliances.
i. Diagnose and appropriately refer patients with complex malocclusion to the specialist.

Periodontology

a. Diagnose the patient's periodontal problem, plan and perform appropriate periodontal treatment.

b. Competent to educate and motivate the patient.
c. Competent to perform thorough oral prophylaxis, sub gingival scaling, root planning and minor periodontal surgical procedures.
d. Give proper post treatment instructions and do periodic recall and evaluation.
e. Familiar with concepts of Osseo integration and basic surgical aspects of Implantology.

Prosthodontics and Crown & Bridge

a. Able to understand and use various dental materials.
b. Competent to carry out treatment of conventional complete and partial removable dentures and fabricate fixed partial dentures.
c. Able to carry out treatment of routine prosthodontics procedures.
d. Familiar with the concept of Osseo integration and the value of implant-supported Prosthodontic procedures.

Conservative Dentistry and Endodontic

a. Competent to diagnose all carious lesions.
b. Competent to perform Class I and Class II cavities and their restoration with amalgam.
c. Restore class V and Class III cavities with glass ionomer cement.
d. Able to diagnose and appropriately treat pulpal involved teeth (pulp capping procedures).
e. Able to perform RCT for anterior teeth.
f. Competent to carry out small composite restorations.
g. Understand the principles of aesthetic dental procedures.

Oral & Maxillofacial Surgery

a. Able to apply the knowledge gained in the basic medical and clinical subjects in the management of patients with surgical problems.
b. Able to diagnose, manage and treat patients with basic oral surgical problems.
c. Have a broad knowledge of maxillofacial surgery and oral Implantology.
d. Should be familiar with legal, ethical and moral issues pertaining to the patient care and communication skills.

e. Should have acquired the skill to examine any patient with an oral surgical problem in an orderly manner.
f. Understand and practice the basic principles of asepsis and sterilization.
g. Should be competent in the extraction of the teeth under both local and general anesthesia.
h. Competent to carry out certain minor oral surgical procedure under LA like trans-alveolar extraction, frenectomy, dento alveolar procedures, simple impaction, biopsy, etc.
i. Competent to assess, prevent and manage common complications that arise during and after minor oral surgery.
j. Able to provide primary care and manage medical emergencies in the dental office.
k. Familiar with the management of major oral surgical problems and principles involved in the in-patient Management.

Public Health Dentistry

a. Apply the principles of health promotion and disease prevention.
b. Have knowledge of the organization and provision of health care in community and in the hospital service.
c. Have knowledge of the prevalence of common dental conditions in India.
d. Have knowledge of community based preventive measures.
e. Have knowledge of the social, cultural and environmental. Factors which contribute to health or illness.
f. Administer and hygiene instructions, topical fluoride therapy and fissure sealing.
g. Educate patients concerning the etiology and prevention of oral disease and encourage them to assure responsibility for their oral health.

8. Recommended Books

a. Human Anatomy, Embryology, Histology & Medical Genetics

Gross Anatomy

i. Snell (Richard.S) Clinical Anatomy
ii. Moorie (Kieth L) Clinical Oriented Anatomy
iii. Datta (A.K) Essentials of human anatomy: Head and Neck
iv. B.D. Chaurasia VOL. III

v. Vishram Singh VOL. III
vi. Romanes (G J), Cunningham manual of practical anatomy: Head and Neck and brain
vii. Neeta V. Kulkarni. Clinical Anatomy

Histology

i. Singh (Inderbir), Text book of Histology
ii. G.P. Pal. Text book of Histology

Embryology

i. Singh (Inderbir), Human Embryology
ii. VishramSingh,Clinical Embryology
iii. Datta (A.K), Essentials of Human Embryology
iv. Langman, Medical Embryology: human development-normal-abnormal

Osteology

i. Datta, asimkumar. Essentials of Human Osteology
ii. Halim A. Surface and radiological Anatomy

ATLAS

i. Netter, Frank H. Atlas of Human Anatomy.
ii. Grant, John C. B. Grant's atlas of Anatomy.
iii. Fiore,Mariano S. H. DI Fiore atlas of Human Histology.

REFERENCE BOOKS

i. Gray Henry. Gray's Anatomy: the anatomical basis of clinical practice.
ii. Decker (CAG) and DJ DUPLESSIS, Lee Megregor's synopsis of surgical anatomy.
iii. Mcminn (RMH), Anatomy regional and applied.

b. Physiology

i. Guyton; Text book of Physiology, 9th edition.
ii. Ganong; Review of Medical Physiology, 19th edition
iii. Vander; Human physiology, 5th edition
iv. Choudhari; Concise Medical Physiology, 2nd edition
v. Chaterjee; Human Physiology, 10th edition
vi. A.K. Jain; Human Physiology for BDS students, 1st edition

vii. Berne &Levy; Physiology, 2nd edition
viii. Best & Taylor's, Physiological basis of Medical Practice, 11th edition

Experimental physiology:

i. Rannade; Practical Physiology, 4th edition
ii. Ghai; a text book of practical physiology
iii. Hutchison's; Clinical Methods, 20th edition

c. Biochemistry

i. Rafi MD (3rd edition). Textbook of Biochemistry
ii. DM Vasudevan. Textbook of Biochemistry
iii. U Satyanarayana. Biochemistry
iv. S.K.Gupta. Biochemistry
v. Divya shanti D'sza, Sowbhagyalakhsmi. An easy guide to Practical Biochemistry.
vi. T.N. Pattabhiraman. Laboratory manual and Practical Biochemistry, 4th edition

REFERENCE BOOKS: (RECENT EDITIONS)

i. Lippincott's' Illustrated reviews – Biochemistry
ii. Harpers' Illustrated Biochemistry
iii. Tietz. Clinical Chemistry
iv. Stryer. Biochemistry

d. Dental Anatomy, Embryology and Oral Histology

i. S.N.Bhaskar - Orban's Oral Histology & Embryology
ii. James & Avery- Oral Development & Histology
iii. Major.M.Ash - Wheeler's Dental Anatomy, Physiology & Occlusion
iv. Woelfel &Scheid- Dental Anatomy - its relevance to dentistry
v. Lavelle - Applied Physiology of the mouth
vi. Jenkins - Physiology & Biochemistry of the mouth

e. General Pathology

i. Robbins – Pathologic Basis of Disease Cotran, Kumar, Robbins
ii. Anderson's Pathology Vol 1 & 2 Editors – Ivan Damjanov& James Linder
iii. Wintrobe's clinical Haematology Lee, Bithell, Foerster, Athens, Lukens

f. Microbiology

i. Ananthanarayan and Paniker's Text Book of Microbiology
ii. Essentials of Medial Microbiology – Apurba S. Sastry, Sandhya Bhat
iii. Parasitology, Protozoology and Helminthology – KD Chatterjee
iv. Immunology – RA Godsby, TJ Kindt, BA Osborne, J Kuby
v. Oral Microbiology and Infectious Diseases – Burnett and Scherp
vi. Bacteriology for students of Dental Surgery - R.B. Lucas and Ivor R.H.Kramer

g. Dental Materials

i. Kennith J, Anusavice -Phillips science of dental materials
ii. William J O'Brien- Dental materials and their selection
iii. Robert Craig- Restorative Dental Materials
iv. John M Powers,JohnWataha- Dental Materials properties and manipulation
v. Jack L Ferracaine - Materials in Dentistry Principals and Application

h. General and dental pharmacology and therapeutics

i. KD Tripathi- Essentials of Dental Pharmacology
ii. Kartzung Betram G- Basic Clinical Pharmacology
iii. HL Sharma, KK Sharma,DK Gupta- Text Book of Dental Pharmacology

i. General Medicine

i. Textbook of Medicine Davidson
ii. Textbook of Medicine Hutchinson

j. General Surgery

Short practice of Surgery Baily & Love

k. Oral Pathology & Oral Microbiology

i. A Text Book of Oral Pathology- Shafer, Hine & Levy
ii. Oral Pathology - Clinical Pathologic correlations – Regezi &Sciubba
iii. Oral Pathology – Soames &Southam
iv. Oral Pathology in the Tropics- Prabhu,Wilson,Johnson
v. Oral and Maxillofacial Pathology - Neville, Damm, Allen, Bouquot.

l. Public Health Dentistry

i. Dentistry Dental Practice and Community by David F. Striffler and Brain A. Burt, Edn. –1983, W. B. Saunders Company
ii. Principles of Dental Public Health by James Morse Dunning, IVth Edition, 1986, Harward University Press.
iii. Dental Public Health and Community Dentistry Ed by Anthony Jong Publication by TheC. V. Mosby Company 1981
iv. Community Oral Health-A system approach by Patricia P. Cormier and Joyce I. Levy published by Appleton-Century-Crofts/ New York, 1981
v. Community Dentistry-A problem oriented approach by P. C. Dental Hand book seriesVol.8 by Stephen L. Silverman and Ames F. Tryon, Series editor-Alvin F. Gardner, PSG Publishing company Inc. Littleton Massachuseltts, 1980.
vi. Dental Public Health- An Introduction to Community Dentistry. Edition by Geoffrey L. Slack and Brain Burt, Published by John Wrigth and sons Bristol, 1980
vii. Oral Health Surveys- Basic Methods, 4th edition, 1997, published by W. H.O. Geneva available at the regional office New Delhi.
viii. Preventive Medicine and Hygiene-By Maxcy and Rosenau, published by Appleton Century Crofts, 1986.
ix. Preventive Dentistry-by J. O. Forrest published by John Wright and sons Bristoli, 1980.
x. Preventive Dentistry by Murray, 1997.
xi. Text Book of Preventive and Social Medicine by Park and park, 14th edition.
xii. Community Dentistry by Dr. Soben Peter.
xiii. Introduction to Bio-statistics by B. K. Mahajan
xiv. Introduction to Statistical Methods by Grewal

m. Paediatric and Preventive Dentistry

i. Dentistry for the Child and Adolescent- Mc Donald
ii. Pediatric Dentistry (Infancy Through Adolescence)- Pinkham
iii. Clinical Pedodontics- Sidney B.Finn
iv. Paediatric Operative Dentistry-Kennedy
v. Behaviour Management- Wright
vi. Clinical Use of Fluorides- Stephen H. Wei
vii. Textbook of Pediatric Dentistry-Braham Morris
viii. Primary Preventive Dentistry-Norman O Harris, Franklin Garcia-Godoy

ix. Understanding of Dental Caries-Nikiforuk
x. Textbook and Color Atlas of Traumatic Injuries to the Teeth - J.O Andreason, C.M Andreason
xi. Textbook of Pedodontics- ShobhaTandon
xii. Handbook of Clinical Pedodontics- Kenneth D
xiii. Comprehensive paediatric dentistry - Nikhil Marwah
xiv. Craniosynostosis diagnosis, evaluation, and management - Cohen, M. M.
xv. Textbook of Pediatric Dentistry -Damle.S.G
xvi. Understanding and management of special child in pediatric dentistry - Gupta, P. V.
xvii. Pediatric dentistry principles & practice - Muthu, M.S
xviii. Principles and practice of Pedodontics – Arthirao

n. Oral Medicine and Radiology

a. Oral Diagnosis, Oral Medicine & Oral Pathology

i. Burkit – Oral Medicine – J.B. Lippincott Company
ii. Coleman – Principles of Oral Diagnosis – Mosby Year Book
iii. Jones – Oral Manifestations of Systemic Diseases – W.B. Saunders company
iv. Mitchell – Oral Diagnosis & Oral Medicine
v. Kerr – Oral Diagnosis
vi. Miller – Oral Diagnosis & Treatment
vii. Hutchinson – clinical Methods
viii. Oral Pathology – Shafers
ix. Sonis.S.T., Fazio.R.C. and Fang.L - Principles and practice of Oral Medicine

b. Oral Radiology

i. White & Goaz – Oral Radiology – Mosby year Book
ii. Weahrman – Dental Radiology – C.V. Mosby Company
iii. Stafne – Oral Roentgenographic Diagnosis – W.B.Saunders Co.,

c. Forensic Odontology

i. Derek H.Clark – Practical Forensic Odontology - Butterworth-Heinemann (1992)
ii. C Michael Bowers, Gary Bell – Manual of Forensic Odontology - Forensic Pr (1995)

o. Orthodontics and Dentofacial Orthopedics

i. Contemporary Orthodontics - William RProffit
ii. Orthodontics for Dental Students - White and Gradiner
iii. Handbook for Dental Students -Movers
iv. Orthodontics - Principles and Practice -Graber
v. Design, Construction and Use of Removable Orthodontic Appliances - C.Philip
vi. Textbook of Orthodontics - MS Rani.
vii. Clinical Orthodontics: Vol1 & 2 –Salzmann orthodontics Graber

p. Oral and Maxillofacial Surgery

i. Impacted teeth; Alling John F &et al.
ii. Principles of oral and maxillofacial surgery; Vol.1,2& 3 Peterson LJ &etal.
iii. Handbook of medical emergencies in the dental office, Malamed SF.
iv. Killeys Fractures of the mandible; Banks P.
v. Killeys fractures of the middle 3rd of the facial skeleton; Banks P.
vi. Killey and Kays outline of oral surgery – Part-1; Seward GR & et al
vii. Essentials of safe dentistry for the medically compromised patients; McCarthy FM
viii. Extraction of teeth; Howe, GL
ix. Minor Oral Surgery; Howe.GL

q. Prosthodontics, Crown & Bridge

i. Boucher- Prosthodontic Treatment Of Edentulous Patient
ii. Heartwell- Syllabus of Complete Denture
iii. Rosensteil- Contemporary Fixed Prosthodontics
iv. Sharry- Complete Denture Prosthetics
v. Shilingburg- Fundamentals of Tooth Preparation
vi. Tylman- Theory and Practice of Fixed Prosthodontics
vii. Jhonston- Modern Practice in Fixed Prosthodontics
viii. McCraken's Removable partial prosthodontics
ix. Shillingburg- Fundamentals of Fixed Prosthodontics
x. Stewart- Clinical Removable Partial Prosthodontics
xi. Maxillofacial prosthetics by – Willam R.Laney.

r. Periodontology

i. Glickman's Clinical Periodontology – Carranza

ii. Contemporary Periodontics – Cohen
iii. Clinical Periodontology Implant Dentistry - Jan Lindhe, T. Karring, N.P Lang.
iv. Periodontics- Grant Strern. Listgarten
v. Periodontology and Periodontics Modern Theory and Practice- Ramfjord M. M. Ash
vi. Colour Atlas of Periodontal Surgery- T. ITO J. D. Johnson
vii. Atlas of Periodontal Surgery- Cohen
viii. Manual of periodontal instruments- Glickman
ix. Fundamentals of periodontics- Wilson and Kornman

s. Conservative Dentistry and Endodontics

i. Sturdevant - The art and Science of Operative Dentistry - 5th edition
ii. Charbeneau - Principles & Practice of Operative Dentistry - 3rd edition
iii. Grossman - Endodontic Practice - 11th edition

t. Aesthetic Dentistry

i. Aesthetic guidelines for restorative dentistry; Scharer & others
ii. Aesthetics of anterior fixed prosthodontics; Chiche (GJ) & Pinault (Alain)
iii. Aesthetic & the treatment of facial form, Vol 28; McNamara (JA)

u. Forensic Odontology

i. Practical Forensic odontology – Derek Clark

v. Oral Implantology

i. Contemporary Implant Dentistry - Carl .E. Misch Mosby 1993 First Edition.
ii. Osseointegration and Occlusal Rehabilitation Hobo S., Ichida .E. and Garcia L.T. Quintessence Publishing Company, 1989 First Edition.

w. Behaviourial Science

i. General psychology -- Hans Raj, Bhatia
ii. Behavioural Sciences in Medical practice -- Manju Mehta

x. Ethics

i. Medical Ethics, Francis C.M., I Ed. 1993, Jaypee Brothers, New Delhi p. 189...

LIST OF JOURNALS:

i. Journal of Dentistry
ii. British Dental Journal
iii. International Dental Journal
iv. Dental Abstracts
v. Journal of American Dental Association
vi. British Journal of Oral and Maxillofacial Surgery
vii. Oral Surgery, Oral Pathology and Oral Medicine
viii. Journal of Periodontolgy
ix. Journal of Endodontics
x. American journal of Orthodontics and Dentofacial Orthopedics
xi. Journal of Prosthetic Dentistry
xii. Journal of Public Health Dentistry
xiii. Endodontics and Dental Traumatology
xiv. Journal of Dental Education
xv. Dental Update
xvi. Journal of Dental Material
xvii. Journal of Indian Society of Pediatric and Preventive Dentistry
xviii. Journal of Clinical Pediatric Dentistry
xix. Journal of Dentistry for Children

I. ADMISSION, SELECTION, COUNSELLING AND MIGRATION

The heading 'ADMISSION, SELECTION, AND MIGRATION' shall be read as under, in terms of (8th Amendment) notification published on 12.7.2017 in the Gazette of India.

1. Eligibility Criteria for Admission:

No Candidate shall be allowed to be admitted to the Dental Curriculum of Bachelor of Dental Surgery (BDS) Course until:

a. He/she shall complete the age of 17 years on or before 31st December, of the year of admission to the BDS course; The following has been inserted, and the existing sub-regulation "2." is re-numbered as "3"., in terms of (5th Amendment) notification published on 31st May, 2012 in the Gazette of India.

b. He/ She have obtained a minimum of marks in National Eligibility-cum-Entrance Test as prescribed in sub-regulation 5 of Regulation II under the heading "Selection of students:" The following has been inserted in terms of (5th Amendment) notification published on 1st June, 2012 in the Gazette of India

c. In order to be eligible to take National Eligibility-cum-Entrance Test he/she has passed qualifying examination as under:-

i. The higher secondary examination or the Indian School Certificate Examination which is equivalent to 10+2 Higher Secondary Examination after a period of 12 years study, the last two years of study comprising of Physics, Chemistry, Biology and Mathematics or any other elective subjects with English at a level not less than the core course for English as prescribed by the National Council for Educational Research and Training after the introduction of the 10+2+3 years educational structure as recommended by the National Committee on education; Note: Where the course content is not as prescribed for 10+2 education structure of the National Committee, the candidates will have to undergo a period of one year pre professional training before admission to the dental colleges;
Or

ii. The intermediate examination in science of an Indian University/Board or other recognized examining body with Physics, Chemistry and Biology which shall include a practical test in these subjects and also English as a compulsory subject;
Or

iii. The pre-professional/pre-medical examination with Physics, Chemistry and Biology, after passing either the higher secondary school examination, or the pre- university or an equivalent examination. The pre-professional/pre-medical examination shall include a practical test in Physics, Chemistry and Biology and also English as a compulsory subject;
Or

iv. The first year of the three years degree course of a recognized university, with Physics, Chemistry and Biology including a practical test in three subjects provided the examination is a "University Examination" and candidate has passed 10+2 with English at a level not less than a core course;
Or

v. B.Sc. examination of an Indian University, provided that he/she has passed the B.Sc. examination with not less than two of the following subjects Physics, Chemistry, Biology(Botany, Zoology) and further that he/she has passed the earlier qualifying examination with the following subjects- Physics, Chemistry, Biology and English;
Or

vi. Any other examination which, in scope and standard is found to be equivalent to the intermediate science examination of an Indian University/Board, taking Physics, Chemistry and Biology including practical test in each of these subjects and English.

The following have been added under the heading "Admission to the Dental Course- Eligibility Criteria" after sub-clause 2 (f), in terms of (2nd Amendment) notification published on 29th October, 2010 in the Gazette of India.

The admission shall be completed by each Dental College/ Institution as per the statutory time schedule for admissions and in no case any admission will be made in the BDS course after 30th of September."

2. Selection of Students:

The selection of students to dental college shall be based solely on merit of the candidate and for determination of the merit, the following criteria be adopted uniformly throughout the country: Procedure for selection to BDS course shall be as follows:-

The following has been substituted in terms of (5th Amendment) notification Published on 1st June, 2012 in the Gazette of India

a. All admissions to BDS course within the respective categories shall be based solely on marks obtained in the National Eligibility-cum-Entrance Test.

b. In order to be eligible for admission to BDS Course for a particular academic year, it shall be necessary for a candidate to obtain minimum of marks of 50 percentile in 'National Eligibility cum-Entrance Test to BDS course' held for the said academic year. However, in respect of candidates belonging to Scheduled Castes, Scheduled Tribes, Other Backward Classes, the minimum marks shall be at 40th percentile. In respect of candidates with locomotor disability of lower amendments, the minimum marks shall be at 45th percentile. The percentile shall be determined on the basis of highest marks secured in the All-India common merit list in "National Eligibility- cum-Entrance Test for admission to BDS course.

c. Provided when sufficient number of candidates in the respective categories fail to secure minimum marks as prescribed in National Eligibility-cum-Entrance Test held for any academic year for admission to BDS Course, the Central Government in consultation with Dental Council of India may at its discretion lower the minimum marks required for admission to BDS Course for candidates belonging to respective categories and marks so lowered by the Central Government shall be applicable for the said academic year only.

d. The reservation of seats in dental colleges for respective categories shall be as per applicable laws prevailing in States/Union Territories. An all India merit list as well as State-wise merit list of the eligible candidates shall be prepared on the basis of the marks obtained in National Eligibility cum-Entrance Test and candidates shall be admitted to BDS course from the said lists only.

e. No Candidate who has failed to obtain the minimum eligibility marks shall be admitted to BDS course in the said academic year.

f. To be eligible for admission to BDS Course, a candidate must have passed in the subjects of Physics, Chemistry, Biology/Biotechnology and English individually and must have obtained a minimum of 50% marks taken together in Physics, Chemistry and Biology/Biotechnology at the qualifying examination and in addition must have come in the merit list of "National Eligibility-cum-Entrance Test" for admission to BDS course. In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or other Backward Classes the minimum marks obtained in Physics, Chemistry and

Biology/Bio-technology taken together in qualifying examination shall be 40% instead of 50%. In respect of candidates with loco motor disability of lower limbs the minimum marks in qualifying examination in Physics, Chemistry and Biology/Bio- technology taken together in qualifying examination shall be 45% instead of 50%.

g. The Central Board of Secondary Education shall be the organization to Conduct National Eligibility cum- Entrance Test for admission to BDS course.

The following has been added under clause II 'Selection of Students', in terms of (8th Amendment) notification published on 27th July, 2017 in the Gazette of India:

Common Counseling

a. There shall be a common counseling for admission to BDS course in all dental educational institutions on the basis of merit list of the National Eligibility- cum-Entrance Test.
b. The designated authority for counseling for the 15% All India Quota seats of the contributing States and all BDS seats of Dental Education Institutions of the Central Government universities established by an Act of Parliament and the Deemed Universities shall be the Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India.
c. The counseling for admission to BDS course in a State/Union Territory, including Dental Education Institutions established by the State Government, University established by an Act of State/Union Territory Legislature, Trust, Society, and Minority Institutions shall be conducted by the State/Union Territory Government.
d. In case any dispute arises on such common counseling, the respective State Government shall refer the matter to the Central Government and its decision shall be final, in this regard.

3. Duration of the Course:

The following provision has been substituted to the extent indicated here under in terms of (3rd Amendment) notification published on 25th August, 2011 in the Gazette of India and the same is as under:-

a. The undergraduate dental programme leading to BDS Degree shall be of 4 academic years with 240 teaching days in each academic year, plus one year paid rotating internship in dental college.

b. The internship shall be compulsory and BDS Degree shall be granted after completion of one year paid internship.

4. Migration and transfer

a. Migration from one dental college to another is not the right of a student. However, the migration of students from one dental college to another dental college in India may be considered by the Dental Council of India. Only in exceptional cases on extreme compassionate ground*, provided following criteria are fulfilled. Routine migrations on other ground shall not be allowed.

b. Both the colleges, i.e. one at which the student is studying at present and one to which migration is sought, is recognised by the Dental Council of India.
c. The applicant candidate should have passed the first professional BDS examination.
d. The applicant candidate submits his application for migration, complete in all respects, to all authorities concerned within one month of passing (declaration of results) the first professional Bachelor of Dental Surgery (BDS) examination.
e. The applicant candidate must submit an affidavit stating that he/she will pursue 240 days of prescribed study before appearing at IInd professional Bachelor of Dental Surgery (BDS) examination at the transferee dental college, which should be duly certified by the Registrar of the concerned University in which he/she is seeking a transfer. The transfer will be applicable only after receipt of the affidavit.

Note 1:

i. Migration is permitted only at the beginning of IInd year BDS Course in recognized Institution.
ii. All applications for migration shall be referred to the Dental Council of India by College Authorities. No Institution/University shall allow migrations directly without the prior approval of the Council.
iii. Council reserved the right, not to entertain any application which is not under the prescribed compassionate grounds and also to take independent decisions where the applicant has been allowed to migrate without referring the same to the Council.

Note 2: *Compassionate ground criteria:

i. Death of supporting guardian.
ii. Disturbed conditions as declared by Government in the Dental College area**.**

5. Attendance requirement, Progress and Conduct

a. 75% in theory and 75% in practical/clinical in each year.

b. In case of a subject in which there is no examination at the end of the academic year/semester, the percentage of attendance shall not be less than 70%. However, at the time of appearing for the professional examination in the subject, the aggregate percentage of attendance in the subject should satisfy the 75% in theory and 75% in practical/clinical.

6. Examinations

These regulations shall be applicable for the BDS degree conducted by the university.

a. Preface:

i. Evaluation is a continuous process, which is based upon criteria developed by the concerned authorities with certain objectives to assess the performance of the learner. This also indirectly helps in the measurement of effectiveness and quality of the concerned B.D.S. programme.

ii. Evaluation is achieved by two processes
   a. Formative or internal assessment.
   b. Summative or university examinations.
   c. Formative evaluation is done through a series of tests and examinations conducted periodically by the institution. Summative evaluation is done by the university through examination conducted at the end of the specified course.

b. Methods of Evaluation:

Evaluation may be achieved by the following tested methods:

i. Written test
ii. Practicals
iii. Clinical examination
iv. Viva voce

c. Internal Assessment Examination

The continuing assessment examinations may be held frequently at least 3 times in a particular year and the average marks of these examinations should be considered. 10% of the total marks in each subject for both theory, practical and clinical examination separately should be set aside for the internal assessment examinations.

d. Scheme of Examination:

The following has been substituted in terms of (3rd Amendment) notification published on 25th August, 2011 in the Gazette of India and the same is as under:-
Universities shall organize admission timings and admission process in such a way that teaching starts from 1st day of August in each academic year.

i. The scheme of examination for B.D.S. Course shall be divided into 1st B.D.S. examination at the end of the first academic year, 2nd B.D.S. examination at the end of second year, 3rd B.D.S. examination at the end of third year, final B.D.S at the end of 4th year. 240 days minimum teaching in each academic year is mandatory.

ii. The examination shall be open to a candidate who satisfies the requirements of attendance, progress and other rules lay down by the University.

iii. The university shall conduct examinations twice in a year at an interval of not less than four to six months.

The following clause in terms of (7th Amendment) notification published in the Gazette of India and the same is as under:-

Any student who does not clear the BDS Course in all the subjects within a period of 9 years, including one year Compulsory Rotatory Internship from the date of admission shall be discharged from the course.

e. Distribution of Subject for University Examinations

I. B.D.S. Examination:

1. General anatomy including embryology and histology
2. General human physiology and biochemistry
3. Dental Anatomy, Embryology and Oral Histology The following has been added in terms of (3rd Amendment) notification published on 25thAugust, 2011 in the Gazette of India and the same is as under:-

Any candidate who fails in one subject in an examination is permitted to go to the next higher class and appear for the subject and complete it successfully before he is permitted to appear for the next higher examination.

II. B.D.S. Examination:

A candidate who has not successfully completed the first B.D.S. examination cannot appear in the second year examination.

1. General Pathology and Microbiology
2. General and dental pharmacology and therapeutics
3. Dental Materials
4. Pre-Clinical Conservative – Only Practical and Viva Voce
5. Pre-Clinical Prosthodontics – Only Practical and Viva Voce

Any candidate who fails in one subject in an examination is permitted to go to the next higher class and appear for the said failed subject and complete it successfully before he is permitted to appear for the next higher examination.

III. B.D.S. Examination:

A candidate who has successfully completed the second year B.D.S. examination can appear third year B.D.S examination.

1. General Medicine
2. General Surgery
3. Oral Pathology and Oral Microbiology

Any candidate who fails in one subject in an examination is permitted to go to the next higher class and appear for the subject and complete it successfully before he is permitted to appear for the next higher examination.

IV. B.D.S. Examination:

A candidate who has successfully completed the third year B.D.S. examination can appear fourth year B.D.S. examination.

1. Oral Medicine and radiology
2. Pediatric & Preventive Dentistry
3. Orthodontics & Dentofacial orthopedics
4. Public Health dentistry
5. Periodontology Orthodontics and Dentofacial Orthopedic
6. Oral & Maxillofacial Surgery
7. Conservative and endodontic
8. Prosthodontics and Crown & Bridge

f. Written Examination

i. The written examination in each subject shall consist of one paper of three hours duration and shall have maximum marks of 70.

ii. In the subjects of Physiology, Biochemistry and Pathology, Microbiology each paper will be divided into two sections, A and B of equal marks.

iii. The question paper should contain different types of questions like essay, short essay, and objective type/ M.C.Q's.

iv. The nature of question set should be aimed to evaluate students of different standards ranging from average to excellent.

v. The questions should cover as broad as area of the content of the course. The essay questions should be properly structured and the marks specifically allotted.

Table VI
Type of Questions and Distribution of marks

Type of Questions	Number of Questions	Marks per Question	Total Marks
MCQ	10	01	10
Long Essay Type	02	08	16
Short Essay Type	06	04	24
Short Answer	10	02	20
		Grand Total	**70**

Table VII Physiology and Biochemistry

	Type of Questions	Number of Questions	Marks of Questions	Total Marks
Physiology	MCQ	05	01	05
	Long Essay Type	01	08	08
	Short Essay Type	03	04	12
	Short Answer	05	02	10
			Grand Total	**35**

	Type of Questions	Number of Questions	Marks of Questions	Total Marks
Biochemistry	MCQ	05	01	05
	Long Essay Type	01	08	08
	Short Essay Type	03	04	12
	Short Answer	05	02	10
	Grand Total			**35**

Table VIII Pathology and Microbiology

	Type of Questions	Number of Questions	Marks of Questions	Total Marks
Pathology	MCQ	05	01	05
	Long Essay Type	01	08	08
	Short Essay Type	03	04	12
	Short Answer	05	02	10
			Grand Total	**35**

	Type of Questions	Number of Questions	Marks of Questions	Total Marks
Microbiology	MCQ	05	01	05
	Long Essay Type	01	08	08
	Short Essay Type	03	04	12
	Short Answer	05	02	10
			Grand Total	**35**

g. Practical and Clinical Examination:

i. Objective Structured Clinical Evaluation:
The clinical and practical examination should provide a number of chances for the candidate to express one's skills. A number of examination stations with specific instructions to be provided. This can include clinical procedures, laboratory experiments, spotters etc. Evaluation must be made objective and structured. The method of objective structured clinical examinations should be followed. This will avoid examiner bias because both the examiner and the examinee are given specific instructions on what is to be observed at each station.

ii. Records/ Log Books:

The candidate should be given credit for his records based on the scores obtained in the record. The marks obtained for the record in the first appearance can be carried over to the subsequent appearances if necessary.

iii. Scheme of clinical and practical examinations:

The specific scheme of clinical and practical examinations, the type of clinical procedures/ experiments to be performed and marks allotted for each are to be discussed and finalized by the Chairman and other examiners and it is to be published prior to the conduct of the examinations along with the publication of the time table for the practical examinations. This scheme should be brought to the notice of the external examiner as and when the examiner reports. The practical and clinical examinations should be evaluated by two examiners of which one shall be an external examiner appointed from other Universities preferably outside the State. Each candidate should be evaluated by each examiner independently and marks computed at the end of the examination.

iv. Viva Voce:

Viva voce is an excellent mode of assessment because it permits a fairly broad coverage and it can assess the problem solving capacity of the student. An assessment related to the affective domain is also possible through viva voce. It is desirable to conduct the viva voce independently by each examiner. In order to avoid vagueness and to maintain uniformity of standard and coverage, questions can be pre-formulated before administering them to each student. Twenty marks are exclusively allotted for viva voce and that can be divided equally amongst the examiners, i.e., 10 marks per examiner.

h. Marks Distribution in Each Subject:

Each subject in which written examination is held.

Theory	
University written examination	70
Viva Voce	20
Internal assessment	10
Total	**100**
Practical/ Clinical	90
University Practical/ Clinical	
Internal assessment	10
Total	**100**

Pre-clinical examination in Prosthodontics and Conservative dentistry

University Practical examination	60
Viva Voce	20
Internal Assessment	20
Total	**100**

Table IX
Distribution of Marks in University Examination and Internal Assessment for Various Subjects From First Year to Final Year

Subject	Theory				Practical/Clinicals			Grand Total
	University paper	Viva voce	Internal Assessment	Total	University examination	Internal Assessment	Total	
I B.D.S **1. General** Anatomy including Embryology and Histology	70	20	10	100	90	10	100	200
2. Section- A General Human Physiology	35	10	05	50	45	05	50	200
Section-B Biochemistry Nutrition and Dietetics	35	10	05	50	45	05	50	
3. Dental Anatomy, Embryology and Oral Histology	70	20	10	100	90	10	100	200
II B.D.S **1. Section - A** General Pathology	35	10	05	50	45	05	50	200
Section - B Microbiology	35	10	05	50	45	05	50	

2. General and Dental Pharmacology & Therapeutics	70	20	10	100	90	10	100	200
3. Dental Materials	70	20	10	100	90	10	100	200
4. Pre-clinical Conservative Dentistry	-	20		20	60	20	80	100
5. Preclinical Prosthodontics	-	20		20	60	20	80	100
III BDS 1. General Medicine	70	20	10	100	90	10	100	200
2. General Surgery	70	20	10	100	90	10	100	200
3. Oral Pathology and Oral Microbiology	70	20	10	100	90	10	100	200
IV BDS 1. Oral Medicine and Radiology	70	20	10	100	90	10	100	200
2. Paediatric & preventive dentistry	70	20	10	100	90	10	100	200
3. Orthodontics & Dentofacial Orthopaedics	70	20	10	100	90	10	100	200
4. Perio-dontology	70	20	10	100	90	10	100	200
5. Prosthodontics and Crown and Bridge	70	20	10	100	90	10	100	200

6. Conservative Dentistry and Endodontics	70	20	10	100	90	10	100	200
7. Oral and Maxillofacial Surgery.	70	20	10	100	90	10	100	200
8. Public Health Dentistry	70	20	10	100	90	10	100	200

i. Criteria for a pass:

Fifty percent of the total marks in any subject computed as aggregate for theory, i.e., written, viva voce, internal assessment and for practicals including internal assessment, separately is essential for a passing all years of study.

i. A candidate shall secure 50% marks in aggregate in university theory including Viva Voce and Internal assessment obtained in University written examination combined together.
ii. A candidate shall secure 50% of University practical marks and Internal Assessment combined together.
iii. In case of pre-clinical Prosthetic Dentistry and Pre clinical conservative dentistry in II BDS, where there is no written examination, minimum for pass is 50% of marks in Practical and Viva voce combined together in University examination including Internal Assessment i.e. 50/100marks.
iv. Successful candidates who obtain 65% of the total marks or more shall be declared to have passed the examination in First Class. Other successful candidates will be placed in Second Class.
v. A candidate who obtains 75% and above is eligible for Distinction. Only those candidates who pass the whole examination in the first attempt will be eligible for distinction or class.
vi. First Class and Distinction to be awarded by the University as per their respective rules.

j. Grace-Marks:

Grace Mark up to a maximum of 5 marks may be awarded to students who have failed only in one subject but passed in all other subjects.

k. **RESIT examination**

Those candidates who fail in the university annual examinations can re-appear for the RESIT examination. The RESIT examination will be held within 90 days from the date of announcement of results of the annual examination. Those who fail in the RESIT examination will have to appear with their junior batch next year.

7. Qualification and experience to be eligible for examiner ship for BDS examination

a. M.D.S. Degree in the concerned subject from a DCI recognized Institution.
b. 4 years of teaching experience in the subject after MDS in the concern subject
c. Should be holding the post of a Reader or above in a Dental Institution approved/recognized by the Dental Council of India for B.D.S.
d. In case of medical subjects the qualification of examiners shall be the same as that prescribed by the DCI for the concerned subject.

Number and Subject of examiner for practical/clinical and Viva voce examination

i. There shall be two examiners for each paper, one internal and one external from medical/dental recognized by the Dental Council of India for BDS course.
ii. The internal examiner will be from within the institution.
iii. The external examiner can be from outside university.
iv. No person shall be an external examiner to the same University for more than 3 consecutive years. However, if there is a break of one year the person can be reappointed.

Note:

a. In case of Physiology and Biochemistry if internal examiner is from Physiology, External examiner should be from Biochemistry or vice versa.
b. In case of Pathology and Microbiology if Internal is examiner is from Pathology, External Examiner should be from Microbiology or vice versa.
c. In case of Dental Materials, if internal is from Prosthodontics, external should be from Conservative dentistry and vice versa.

8. Readmission:

A candidate who discontinues the course is eligible for readmission as per the norms of the university

9. Ranking

a. Only candidates who have passed all the subjects of the examination in the first attempt will be considered for ranking.
b. Marks obtained in supplementary examinations will not be considered for ranking.
c. Rank will be awarded only after the final BDS examination.
d. For ranking in the final BDS, aggregate marks secured in all the subjects from I to IV BDS will be considered.

II. Syllabus of Study

First Year
Course Content
ANATOMY

Teaching Hours	
Subject Title	Anatomy
Duration	0-12 Months
Total Hours	275 hrs - Theory 100 hours, Practical 175 hours
Total Hours / week	10 Hrs
Lecture	3 Hours/week
Practical	6 Hours/week
Seminar / Tutorials	1Hour/week
Method of Assessment	Written, Oral, Practical

Aims and Objectives

The dental graduates during training in the institutions should acquire adequate knowledge, necessary skills and such attitudes which are required for carrying out all the activities appropriate to general dental practice involving the prevention, diagnosis and treatment of anomalies and diseases of the teeth, mouth, jaws and associated tissues. The graduate should also understand the concept of community oral health education and be able to participate in the rural health care delivery programs existing in the country.

GENERAL ANATOMY (30 hrs) - Theory 10hours +Demonstration 20 hours
GENERAL ANATOMY (20 hrs.)

Sr. No.	Topic	Learning Content Distribution			Teaching methodology with hours
		Must know	**Desirable to know**	**Nice to know**	
1	**Introduction**	Basic Anatomical Nomenclature, Planes, Positions Subdivisions of Anatomy	History of Anatomy	Contribution by Anatomist towards the subject	Lecture 2 hours Demonstration 2 hours
2	**Skin & Superficial fascia**	Structure & Function Appendages	Types of sweat glands Types of sensory receptors	Development &Applied Aspects	Lecture 1 hour Demonstration 2 hours
3	**Deep Fascia**	Structure, Modifications & Functions of Deep fascia	Details of Modifications	Clinical correlation of Modifications of Deep fascia	Lecture 1 hour Demonstration 2 hours
4	**Muscles**	Classifications with examples Nomenclature of Muscles	Neuro Muscular\ junction, Skeletal muscle Fibres	Applied Anatomy	Lecture 1 hour Demonstration 2 hours
5	**Blood Vessels**	Structural & Functional Classifications with examples	Types of Anastomosis	Vascular Diseases	Lecture 1 hour Demonstration 2 hours

6	**Neurology**	Parts of Nervous system Structure & Function of different cells of Nervous System Typical Spinal Nerve Synapses	Neurotrans mitters NM junction Reflex arc	Disease of Nervous System	Lecture 1 hour Demonstr ation 4 hours
7	**Bones**	Detail classification with examples Gross Anatomy of long bone	Development &centers of ossification	Applied Anatomy	Lecture 1 hour Demonstr ation 2hours
8	**Joints**	Classification with examples Structure of Typical Synovial joint	Hilton's Law Factors influencing movements	Body levers Anatomical Correlation with disease of joints Bio mechanics	Lecture 1 hour Demonstr ation 2 hours
9	**Lymphatic System**	Formation & Components of Lymphatic System in detail Functions of Lymphatic system	Growth Pattern of Lymphoid Tissue	Clinical correlation with Diseases of Lymphatic System	Lecture 1 hour Demonstr ation 2 hours

HEAD & NECK (110 hrs) - Theory 36 hours + Practical 74 hours

S NO	Topic	Learning Content Distribution			Teaching methodology with hours
		Must know	**Desirable to know**	**Nice to know**	
1	**Head**	-Scalp , face -Lacrimal Apparatus	-Nerve plexus between Facial & Trigeminal Nerve		Lecture – 4 hours Dissection – 6 hours
2	**Parotid Region**	Parotid Gland & Structures related to it	-Frey's Syndrome		Lecture – 2 hours Dissection – 4 hours
3	**Deep Cervical Fascia**	All layers & its reflection	-Pharyngeal spaces	-Clinical Anatomy	Lecture – 1 hour Dissection – 2 hours
4	**Neck**	-Posterior triangle -Suboccipital triangle -Anterior Median Region of neck -Anterior triangle-Submental triangle -Digastric triangle -Carotid triangle & Submandibular region -Thyroid gland -Deep	-Muscular triangle	-Applied Aspect	Lecture – 7 hours Dissection – 20 hours

		structures of neck -Subclavian artery, cervical part of sympathetic chain & its branches in detail			
5	**Cranial Cavity**	-Meninges -Dural venous sinuses , Cavernous sinus in detail -Cranial Nerves -Pituitary Gland	-Trigeminal Ganglion	-Clinical Correlation	Lecture – 3 hours Dissection – 10 hours
6	**Orbit**	Boundaries and contents- extraocular muscles, ophthalmic artery, nerves of orbit, ciliary ganglion	-Eye ball	-Applied Anatomy	Lecture – 2 hours Dissection – 6 hours
7	**Infra-temporal Fossa**	-Muscles of Mastication -Maxillary Artery -Mandibular Nerve & Otic Ganglion -Temporo-Mandibular Joint	-Pterygoid venous plexus & its connection -Pterygo – palatine fossa & its contents	-Applied Aspect	Lecture – 5 hours Dissection – 10hours

8	**Nose**	-Walls of Nasal cavity -Para-nasal Air sinus	-Applied Anatomy		Lecture – 2 hours Demonstration – 2 hours
9	**Oral Cavity**	-Palate -Tongue	-Anatomy of Tooth & gums		Lecture – 2 hours Demonstration – 4 hours
10	**Pharynx**	-Nasopharynx – Eustachian tube -Oropharynx-Palatine Tonsil -Laryngopharynx – Piriform Fossa -Walls of Pharynx	-Pharyngeal nerve plexus -Applied Aspect	-Deglutition	Lecture – 3 hours Demonstration – 4 hours
11	**Larynx**	-Skeleton & Muscles of Larynx -Interior of larynx -Glottis	-Applied Aspect	-Vocal Tracts	Lecture – 3 hours Demonstration – 4 hours
12	**Ear**	-External Ear -Middle Ear	-Ear Ossicles -Inner Ear		Lecture – 2 hours Demonstration – 2 hours

GENERAL HISTOLOGY (60 hrs) -Theory 20 hours + Practical 40 hours

S NO	Topic	Learning Content Distribution			Teaching methodology with hours
		Must know	**Desirable to know**	**Nice to know**	
1	**Microscope & common objects under microscope**	-Different types of microscopes -Compound microscope Parts & Functions of working principal of different types of microscopes -H & E staining		-Tissue processing & slide preparation special staining method	Lecture –2 hours Practical – 4 hours
2	**Epithelium**	-Types & Function of each Epithelium -Glands	-Surface modification of cell	-Junctional complexes	Lecture – 2 hours Practical – 4 hours
3	**Connective Tissue**	Components, Types & -Function of connective tissue	-Details of each component	-Applied Aspect	Lecture – 1 hour Practical – 2 hours
4	**Cartilage**	-Components of cartilage -Types, Structure in detail of each types of cartilage	-Growth of cartilage	-Applied Aspect	Lecture – 1 hour Practical – 2 hours
5	**Integumentary system**	-Types, Structure, Functions-Skin -Appendages	-Details of the appendage	-Clinical histology	Lecture – 1 hour Practical – 2 hours

6	**Bone**	-Types -Structural composition of -bone	-Ossification	-Applied Histology	Lecture – 1 hour Practical – 2 hours
7	**Muscular Tissue**	-Types Structural organization	-Muscle triad -Details of intercalated disc	-Muscular contraction	Lecture – 1 hour Practical – 2 hours
8	**Nervous Tissue**	-Classification of Nerve Fibres with example -Myelinaiton -Structure of different types of ganglia	-Types of nerve injury	-Applied Histology	Lecture – 1 hour Practical – 2 hours
9-	**Blood – Vascular System**	Structural classification of blood vessels in detail	-Micro – structure of -Anastomosis	-Applied Histology	Lecture – 1 hour Practical – 2 hours
10	**Lymphatic System**	Structure of Primary & Secondary lymphatic organ	Circulation of lymph in -Lymph Node -Blood – Thymus Barrier -Theories of Splenic circulation.	-Waldeyer's ring	Lecture – 2 hours Practical – 4 hours

11	**Glands**	Serous, mucous, mixed salivary glands	Structural & functional correlation		Lecture – 1 hour Practical – 2 hours
12	**Endocrine glands**	Pituitary, thyroid, Para thyroid suprarenal and Pancreas	Structural & functional correlation		Lecture – 2 hours Practical – 4 hours
13	**Ovary, Testis, Liver, Kidney**				Lecture- 2hours Practical- 4 hours
14	**Lip, tongue, Oesophagus**	Histological structure of each tissue			Lecture – 1 hour Practical – 2 hours
15	**Trachea and Lung**	Histological structure of each tissue			Lecture – 1 hour Practical – 2 hours

GENERAL EMBRYOLOGY (40 hours) - Theory 30 hours+ Models Demonstration 10 hours

S NO	Topic	Learning Content Distribution			Teaching methodology with hours
		Must know	**Desirable to know**	**Nice to know**	
1	**Introduction**	-Male & Female reproductive system -Gestational period its subdivisions -Gametogenesis – spermatogenesis, oogenesis -Structure of male & Female gametes -Fertilization – stages & effects of fertilization	-Process involved in development -Principles of family planning	-Organizers -In vitro fertilization	Lecture – 4 hours
2	**1st week changes**	-Zygote formation -Clearage division -Formation of morula & blastocyst -Implantation	-Types & Abnormal sites of implantation	-Basis of multiple births	Lecture – 3 hours
3	**2nd week changes**	-Differentiation of embryoblast -Differentiation trophoblast -Bilaminar germ disc -Other events occurring during 2nd week			Lecture – 2 hours

4	**3rd week changes**	-Formation of trilaminar germ disc -Primitive streak -Formation of notochord -Development of chorionic villi -Derivatives of ectoderm, endoderm & mesoderm -Intra – embryonic mesoderm -Allantoic diverticulum Connecting stalk	-Formation of neuro-enteric canal		Lecture - 3 hours
5	**Embryonic period (4-8week)**	-Formation of neural tube & neural crest cells -Formation of somites -Folding of embryo -Formation & subdivision of gut tube	-Structure along the median plane of developing germ disc in cephalo-caudal direction -Estimation of embryonic age		Lecture - 3 hours
6	**Foetal period**	(3rd month to birth)	-Brief account of maturation of tissues, organs and growth of body Estimation of age		Lecture - 2 hours

7	**Placenta**	-Stages of formation -Features & functions -Types of placenta -Placental barrier -Abnormalities of placenta	-Umbilical cord -Formation & features		Lecture - 2 hours
8	**Amniotic cavity**	Arrangement of foetal membranes	-Amniotic cavity & membrane -Amniotic fluid -Chorion	-Formation of twins -Types of twinning	Lecture -1 hour
9	**Teratology**		-Causative factor for congenital malformation -Teratogens		Lecture -1 hour
10	**Development of head, neck**	Branchial apparatus - differentiation & derivatives in detail with congenital anomalies -Development face, Nasal cavity, Palate -Development of endocrine glands , development of pituitary gland	Development of salivary glands		Lecture – 9 hours
11	**Embryology models demonstration**				Practical -10 hours

SURFACE ANATOMY 9 hours - Theory 2 hours + Demonstration 7 hours

S NO	Topic	Learning Content Distribution			Teaching methodology with hours
		Must know	**Desirable to know**	**Nice to know**	
1		Surface features & bony projections of all the regions of the body			Lecture – 1 hour Demonstration – 3 hours
2		Surface marking of all the Important neuro vascular structurs and organs of head, neck & face region			Lecture- 1 hour Demonstration -4 hours

OSTEOLOGY (20 hours)

S NO	Topic	Learning Content Distribution			Teaching methodology with hours
		Must know	**Desirable to know**	**Nice to know**	
1	**Skull**	- All Normas, All cranial fossae, Individual bones of - skull -Cervical vertebra -Hyoid bone -Fetal Skull -Individual bones of skull	All Cranial Fossa		Practical-Osteology Demonstration Tutorial 20 hrs

RADIOLOGICAL ANATOMY (6 hours) – Theory 2 hours+ Practical 4 hours

S No	Topic	Teaching methodology with hours
1.	AP and Lateral Views of Head and Neck region including special X-rays.	Theory- 2 hours practical demonstration- 4 hours

A. Recommended Text and Reference books, Journals and Atlases

Text Books

Gross Anatomy

1. SNELL (Richard.S) Clinical Anatomy
2. MOORE (Kieth L) Clinical Oriented Anatomy
3. DATTA (A.K) Essentials of human anatomy: Head and Neck
4. B.D. CHAURASIA Vol. III,
5. VISHRAM SINGH Vol. III,
6. ROMANES (G J), Cunningham manual of practical anatomy: Head and Neck and brain
7. Neeta V. Kulkarni. Clinical Anatomy.

Histology

1. SINGH (Inderbir), Text book of Histology
2. G. P. Pal. Text book of Histology

Embryology

1. SINGH (Inderbir), Human Embryology
2. VISHRAM SINGH,Clinical Embryology
3. DATTA (A.K), Essentials of Human Embryology
4. LANGMAN, Medical Embryology: human development-normal-abnormal

Osteology

1. DATTA, ASIM KUMAR. Essentials of Human Osteology.
2. HALIM A. Surface and radiological Anatomy

Atlas

1. Netter, Frank H. Atlas of Human Anatomy.
2. Grant, John C. B. Grant's atlas of Anatomy.
3. FIORE, MARIANO S. H. Di Fiore atlas of Human Histology.

Reference Books

B. GRAY HENRY. Gray's Anatomy: The anatomical basis of clinical practice.
C. DECKER (CAG) and DJ DUPLESSIS, Lee Mc Gregor's synopsis of surgical anatomy.
D. Mc MINN (RMH), Anatomy regional and applied

Table- Theory Paper-Type of Questions and Distribution of marks

SCHEME OF EXAMINATION

A) Theory Marks

University Written Exam : 70 Marks
Viva Voce : 20 Marks
Internal Assessment (Theory) : 10 Marks
Total : 100 Marks

Type of Questions	Number of Questions	Marks per Question	Total Marks
MCQ	10	01	10
Long Essay Type	02	08	16
Short Essay Type	06	04	24
Short Answer	10	02	20
		Grand Total	**70**

Viva Voce	**20 marks**
1 Osteology of head & neck	5 marks
2. Soft parts	5 marks
3. Embryology models	5 marks
4. Radiological anatomy	5 marks

Topics distribution and Weightage of marks – Theory

Subject Name: Human Anatomy							
Sl. No	**Topics**	**Recommended Marks**	**Actual Marks in the Question Paper**				
			MCQ	**SLEQ**	**SEQ**	**SAQ**	**Total**
1	MCQ 1 Qn from Histology 1 Qn from Embryology 1 Qn from Osteology of Head & Neck 1Qn from General Anatomy 6 Qn from Gross Anatomy	10X1=10	10X1=10				**10**
2	SLEQ 2 Questions from All topics from Must know	2X8=16		2X8=16			**16**
3	SEQ (6) 1 Qn from Histology 1 Qn from Embryology 1 Qn from Osteology of Head & Neck 3 Qns from Gross Anatomy any topic	6X4=24			6X4=24		**24**

4	SAQ (10) 1 Qn from Histology 1Qn from Embryology 1 Qn from Osteology 1Qn from General Anatomy 6 Qns from Gross Anatomy any topic	10X2=20				10X2=20	**20**
	Total Marks		**10**	**16**	**24**	**20**	**70**

B. Clinical / Practical Examination:

University Examination : 90 Marks
Internal Assessment : 10 Marks
Total : 100 Marks

Gross Anatomy	1. Spotters 2. Discussion of one dissected specimen 4. Surface marking	15x2=30 marks 1x10=10 marks 1x10=10 marks
Histology	1. Spotters 2 marks each 2. Discussion of two Slides	10x2=20 marks 2x10=20marks

PHYSIOLOGY

Aims:

The broad goal of teaching undergraduate students in Physiology aims at providing the students comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and diseases.

Educational objectives:

At the end of the course, the students will be able to:

1. Describe the normal functions of all the organ systems, their regulatory mechanisms and interactions of the various systems for well-coordinated total body function.
2. Understand the relative contribution of each organ system in the maintenance of the milieu interior (homeostasis).
3. Explain the physiological aspects of normal growth and development. Analyze the physiological responses and adaptation to stresses.
4. Comprehend the physiological principles underlying pathogenesis and treatment of disease.

Skills:

At the end of the course the student shall be able to

1. Conduct experiments designed for study of physiological phenomena.
2. Interpret experimental/investigative data.
3. Distinguish between normal & abnormal data derived as a result of tests which he/she has performed and observed on experimental /human subjects in the laboratory.

Teaching hours:

Lecture Hours	– 120 Hrs.
Practical Hours	– 60 Hours
Total	– 180

Theory:

Sr. No.	Topic	Learning Content Distribution		Teaching methodology with hours
		Must know	**Desirable to know**	
1	**General Physiology**	Cell- Morphology - Functions of organelles: Cell membrane, nucleus, mitochondria, ribosomes, Lysosomes.	Transport mechanisms Neuromuscular junction, excitation contraction coupling, Myasthenia gravis, Rigor Mortis Body fluid compartments Principles of measurement, normal values	4 Lecture / Small group teaching
2	**Muscle nerve physiology**	Neurons: Morphology, classification, Nerve Fibres classification, resting membrane potential, action potential, properties, conduction of impulses in myelinated & non myelinated fibres Neuroglia: Types & functions. Muscles: Types, structure of skeletal & smooth muscles, Sarcomere, mechanism of contraction, strength-duration curves, utilization time, rheobase & chronaxie.		8 Lecture / Small group teaching

3	**Blood**	Composition, properties, functions. RBC; Morphology, functions, count, physiological variations and life span Erythropoiesis - stages, essential factors, regulation. Haemoglobin: Function, concentration, physiological variations Fate of Hb - Jaundice, types. Determination of color index, MCH, MCV, MCHC, PCV - normal values M = Mean, C = Corpuscular, H = Haemoglobin concentration. WBCs Morphology, functions of all types including T & B lymphocytes, total and differential counts, physiological variations, leukocytosis & Leukopenia Platelets: Morphology, count, functions, thrombocytopenia & bleeding time. Plasma proteins: Concentrations and functions. Blood groups " Basis of blood grouping, Landsteiner's laws, ABO	Development of WBC's & platelets Electrophoresis, Plasma pheresis Blood bank	15 Lecture / Small group teaching

		system, determination of blood groups, blood transfusion, complications of incompatible blood transfusion, RH group, erythroblastosisfoetalis, prevention and treatment. Haemostasis: mechanisms. Clotting mechanism: factors, intrinsic and extrinsic pathways, Disorders of clotting - haemophilia, vitamin K deficiency. Anti-clotting mechanisms: Antithrombin III, heparin, thrombomodulin & plasminogen, anticoagulants. Anaemias: nutritional, aplastic, megaloblastic, iron deficiency. Effects of anaemia Blood volume: Normal values, determination, regulation. Lymph : formation, circulation, composition, functions		

4	**Gastrointestinal System**	Salivary secretion : composition, functions, regulation Stomach: functions. Gastric juice: composition, functions, regulation, gastrin, gastric emptying time. Pancreas: composition, function, regulation of pancreatic juice secretion. Secretion, cholecystokinin - pacreozymin. Liver: functions. Bile : composition, functions, Gall bladder: functions, regulation of emptying Succus entericus : composition, function, regulation of secretion Movements of small and large intestines. Defaecation	Deglutition	10 Lecture / Small group teaching
5	**Respiratory System**	Physiological anatomy of the lungs. Definitions of terms used in respiratory physiology: Eupnoea, Hyperpnoea, tachypnoea, apnoea, dyspnoea. Mechanics of breathing - intrapulmonary and intrapleural pressure changes during a respiratory cycle. Spirometry-lung volumes	Compliance of the lungs P 50 value, Co-efficient of oxygen utilization Dysbarism, Dyspnoea - Dyspnoeic index Non- respiratory function of respiratory system	12 Lecture / Small group teaching

		and capacities. Vital capacity, times vital capacity, maximal voluntary ventilation Dead space: types, measurement of anatomical dead space. Pulmonary & alveolar ventilation. Surfactant: production, functions, respiratory distress syndrome. Oxygen transport: Oxy Hb dissociation curves, factors affecting it. Carbon dioxide transport: forms, chloride shift (Hamburgers phenomenon) Regulation of respiration: Neural regulation: centers - Dorsal Group of Respiratory Neurons (DRG), Ventral group of respiratory neurons (VRG), Nuclear Para Brachialis medialis (NPBL), Hering-breuer reflex. Chemical regulation : peripheral and central chemoreceptors, ventilatory responses to oxygen lack, carbon-di-oxide and H - ions, effect of voluntary hyper ventilation		

		Hypoxia: Types and effects, acclimatization to high attitudes. Cyanosis, asphyxia, Artificial respiration		
6	**Cardiovascular System**	Plan of CVS Greater and Lesser Circulation. Physiological anatomy of the heart, nerve supply. Origin and spread of cardiac impulse. Structure and properties of cardiac muscle. Cardiac cycle : Intraventricular pressure and volume curves Heart sounds, causes, characteristics and significance a Normal ECG, leads causes of waves, P-R interval Cardiac output : Definitions, normal values, physiological variations, determination, (Principles underlying the methods only), regulation. Arterial blood pressure : Definitions, normal values, physiological variations, factors maintaining blood pressure, Regulation - Vasomotor control, role of afferents to Vasomotor centre (VMC)-	Cardiovascular changes in muscular exercise.	15 Lecture / Small group teaching

		baro receptors, Bainbridge reflex, chemoreceptros, hypertension. Heart rate-physiological variations, sinus arrhythmia, Mary's law, Bainbridge reflex, chemo receptors, radial pulse. Hypovolaemic (Haemorrhagic) shock, physiological basis of signs and symptoms Coronary circulation		
7	**Renal System**	Functions of kidneys. Nephrons - cortical & juxtamedullary. Juxta glomerular apparatus - functions. Mechanism of urine formation: ultrafiltration, GFR - Factors affecting, selective reabsorption-sodium, urea, water, glucose. Tubular secretion. Water excretion, mechanism of urine concentration. Concept of clearance-insulin, PAH & urea clearances. Micturition, Innervation of bladder, cystometrogram, diuresis.	TmG, rental threshold for glucose, tubular load for glucose. Counter current mechanism	8 Lecture / Small group teaching

8	**Endocrinology**	Major endocrine glands. Hormone: definition, properties, mechanisms of action. Anterior pituitary: Hormones and their functions, regulation of each hormone, disorders - Gigantism, acromegaly, dwarfism. Posterior pituitary: hormones - site of synthesis, regulation, diabetes insipidus Thyroid: synthesis of hormones, actions and functions, regulation, disorders: simple goitre, myxoedema, cretinism, Graves' disease. Adrenal cortex: classification of hormones, actions, functions, regulation of secretion of cortisol and aldosterone. Adrenal medulla: actions of adrenaline and noradrenaline, regulation of secretion. Endocrine pancreas: hormones, actions, functions, regulation of secretion. Regulation of blood glucose level, diabetes mellitus. Parathyroids: hormones, actions of hormones,	Structure of thyroid, pituitary, pancreas, parathyroid, Adrenal cortex and medulla Synthesis of thyroid hormone. Disorders -Addison's disease, Cushings syndrome, Conn's Syndrome, Adrenogenital syndrome, Pheochromocytoma Methods of study of endocrine glands	14 Lecture/ Small group teaching

		regulation of secretion. a Hypo- & hyper parathyroid conditions, tetany - signs. Calcitonin - source, actions. Regulation of blood calcium level - Calcitriol.		
9	**Reproductive Physiology**	Male reproductive system: functions of testes, puberty, spermatogenesis, actions of testosterone, regulation of secretion, of semen. Female reproductive system: Structure of ovary & Uterus, hormones, actions, regulation. Menstrual cycle, Hormonal basis of changes in menstrual cycle physiological changes during pregnancy. Action of oestrogen and progesterone, Functions of placenta, Lactation, milk ejection reflex. Family Planning Methods: In the males: Coitus In females: Rhythm method, Intra Uterine Contraceptive Device (IUCD), oral contraceptives, tubectomy.		6 Lecture/ Small group teaching

10	**Nervous System**	Synapse: Types, properties Sensory receptors: definition, classification, properties. Reflex action: Definition reflex arc, classification, general properties. Pathways for fine touch, pressure, proprioception, crude touch, thermal and pain sensations, referred pain. Spino-cerebellar tracts : pathway and function Pyramidal tracts: origin, course, termination and functions. Sings of upper & lower motor neuron lesions. Functions of Cerebellum, Basal ganglia, Thalamus, Hypothalamus. Signs of Cerebellar disorders & Parkinson's disease. Reticular formation, EEG, Sleep (NREM, REM)) Functions of Limbic system, Cerebral cortex: lobes & functions. Autonomic Regulation of body temperature.	Reflexes - Flexion reflex, stretch reflex, reverse stretch reflex. Connections of cerebellum, basal ganglia, Thalamus & hypothalamus Functions of Vestibular apparatus - Reticular formation EEG - sleep, Wakefulness. Methods of study of functions of nervous system Higher function of Brain - Memory, Learning & Motivation	10 Lecture/ Small group teaching

11	**Special Senses**	Vision: physiological anatomy of eye ball, functions of iris, aqueous humor, lens, rods & cones. Accommodation to near vision. Refractive errors: Myopia, hypermetropia, presbyopia & astigmatism. Visual acuity, pupillary reflexes. Visual pathway Audition: Anatomic consideration, functions of outer, middle & inner ear, cochlea, organ of corti, mechanism of hearing. Auditory pathways, deafness - types & tests. Taste : taste buds, primary taste sensation, pathway for taste sensation Smell: receptors, olfactory pathways.	Effects of lesions of visual pathways. Field of vision, colour vision, colour blindness.	18 Lecture/ Small group teaching

Practicals
(Experiments done by students are 1to 12 only)

Sr. No	Topic	Hours &Teaching method
1	Study of Microscope and its uses	2Hours. DOAP
2	Collection of blood and study of haemocytometer	2 Hours .DOAP
4	Determination of RBC count	8 Hours .DOAP
5	Determination of WBC count	4 Hours. DOAP
6	Determination of blood groups	2 Hours .DOAP
7	Leishman's staining and differential leucocyte count	10 Hours .DOAP
8	Calculation of blood indices	2 Hours. Small group discussion
9	Determination of bleeding time	1Hour .DOAP
10	Determination of clotting time	1Hour .DOAP
11	Blood pressure recording	4 Hours. DOAP
12	Auscultation of Heart sounds	4 Hours .DOAP
13	Determination of Erythrocyte Sedimentation rate (ESR)	Demonstrations: 2 Hours
14	Determination of packed cell volume (PCV)	Demonstrations: 2 Hours
15	Determination of specific gravity of blood	Demonstrations: 2 Hours
16	Fragility test for RBC	Demonstrations: 2 Hours
17	Clinical examination of chest	Demonstrations: 2 Hours
18	Determination of vital capacity	Demonstrations:2 Hours
19	Artificial respiration	Demonstrations:2 Hours
20	Demonstration of deep and superficial reflexes	Demonstrations:2 Hours

DOAP: Demonstration, Observation, Assistance, Performance

A. Recommended Text and Reference books, Journals and Atlases

a. Guyton Arthur and Hall, Text book of Medical Physiology. A South Asian Edition Elsevier publication Bangalore 12th Ed 2013
b. Concise medical physiology Chaudhuri Sujit. K Central Book Agency Calcutta 6th Edition 2008
c. Chatterjee C. C. Human Physiology Vol - I Medical Allied Agency Calcutta 11th Edition 1985 reprint 2016.
d. Chatterjee C. C. Human Physiology Vol - II Medical Allied Agency Calcutta 11th Edition 1985 reprint 2016.
e. Jain A K, Human Physiology for BDS Avichal publications, New Delhi, 4th Edition
f. 2010.

B. Reference Books:

a. Ganong William. F Review of Medical Physiology Indian Edition McGraw Hill publication New Delhi 25th Edition 2016.
b. Physiological basis of Medical practice Best & Taylor Willian & Wilkins Hongkong London 13th Edition 2012.

Scheme of examination:

A) Theory Marks

University Written Exam	: 35 Marks
Viva Voce	: 10 Marks
Internal Assessment (Theory)	: 05 Marks
Total	: 50 Marks

Type of Questions	Questions to be set	Questions to be answered	Marks per Question	Total Marks
M.C.Q.'s	5	5	1	**5**
Long Essays OR SLEQ	1	1	8	**8**
Short Essays OR SEQ	3	3	4	**12**
SAQ or Short Answers	5	5	2	**10**
Maximum Marks				**35**
			Total	**35**

Topics distribution and Weightage of marks – Theory

Subject Name: Physiology							
Sl. No	**Topics**	**Recommended Marks**	**Actual Marks in the Question Paper**				
			MCQ	**SLEQ**	**SEQ**	**SAQ**	**Total**
1	SLEQ 1 Question from Must know area from • Blood • Gastrointestinal tract • Cardiovascular System • Respiratory System • Endocrines • Reproductive System	1 x 8					
2	SEQ: 3 Questions from each systems mentioned above for SLEQ (excluding system from which SLEQ is taken)	3x4=12					
3	SAQ: 5questions from • General Physiology, • Nerve muscle physiology • Renal system • Nervous system • Special senses (systems except mentioned above in SLEQ)	5x2 =10					

Weightage of marks based on topics

S. No.	Topics	Weightage
1	General Physiology	**2-4**
2	Muscle Nerve Physiology	**2-4**
3	Blood	**6-8**
4	Gastrointestinal tract	**4-8**
5	Respiratory System	**4-8**
6	Cardiovascular System	**6-8**
7	Renal System	**2-4**
8	Endocrines	**4-8**
9	Reproduction Physiology	**4-8**
10	Nervous System	**2-4**
11	Special Senses	**2-4**

B. Clinical / Practical Examination:

University Examination : 45 Marks
Internal Assessment : 05 Marks
Total : 50 Marks

Major Experiments (30 Marks)	**Minor Experiments (15 Marks)**
1. R.B.C. Count 2. W.B.C. Count 3. Differential Count 4. Blood Pressure Recording	1. Determination of Blood Groups 2. Determination of Bleeding & Clotting time 3. Haemoglobin Estimation 4. Calculation of absolute Haematological Indices - MCH MCV, MCHC

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BIOCHEMISTRY

Aims and Objectives:

Goal: The Dental graduates during training in the institutions should acquire adequate knowledge, necessary skills and such attitudes which are required for carrying out all the activities appropriate to general dental practice involving the prevention, diagnosis and treatment of anomalies and diseases of the teeth, mouth, jaws and associated tissues. The graduate should also understand the concept of community oral health education and be able to participate in the rural health care delivery programmes existing in the country.

The major aim is to provide a sound but crisp knowledge on the biochemical basis of the life processes relevant to the human system and to dental/medical practice. The contents should be organised to build on the already existing information available to the students in the pre-university stage and reorienting. A mere rehash should be avoided.

The chemistry portion should strive towards providing information on the functional groups, hydrophobic and hydrophilic moieties and weak valence forces that organise macromolecules. Details on structure need not be emphasised.
Discussion on metabolic processes should put emphasis on the overall change, interdependence and molecular turnover. While details of the steps may be given, the student should not be expected to memorise them. An introduction to biochemical genetics and molecular biology is a must but details should be avoided. The exposure to antivitamins, antimetabolites and enzyme inhibitors at this stage, will provide a basis for the future study of medical subjects. An overview of metabolic regulation is to be taught by covering hormonal action, second messengers and regulation of enzyme activities. Medical aspects of biochemistry should avoid describing innumerable functional tests, most of which are not in vogue.

Objectives:

Knowledge:

At the end of the course, the student should be able to:

1. Describe the molecular and functional organization of a cell and list its sub cellular components
2. Delineate structure, function and inter-relationships of bio molecules and consequences of deviation from normal
3. Summarize the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered
4. Describe digestion and assimilation of nutrients and consequences of malnutrition
5. Integrate the various aspects of metabolism and their regulatory pathways
6. Familiarize with the principles of various laboratory investigations and instrumentation, analysis and interpretation of a given data

Skill:

At the end of the course, the student should be able to :

1. Make use of biochemical analysis relevant to clinical screening and diagnosis;
2. Analyze and interpret investigative data;
3. Demonstrate the skills of solving scientific and clinical problems and decision making in oral health

The knowledge acquired in biochemistry should help the students to integrate molecular events with structure and function of the human body in oral health and disease

Teaching hours:

Lecture Hours	– 70 hrs.
Practical Hours	– 60 hrs.
Total	– 130 hrs

Theory:

Sr. No.	Topic	THEORY - Learning content distribution		Teaching methodology with hours
		Must know	**Desirable to know**	
1	**Introduction to Biochemistry and Scope of biochemistry in dentistry**	Examples of normal biochemical process Examples of biochemical derangements involved in disease development Examples of application of laboratory medicine in screening, diagnosis and prognosis of diseases		1 Lecture
2	**Cell**	Cell Membrane – structure and function Transport across membrane, Exocytosis, endocytosis.	Cytoskeleton	1 Lecture
3	**Chemistry of Carboydrate**	Definition, Biomedical importance Classification with examples Polysaccharides – classification, Homopolysaccharides– starch and glycogen, Dextran, Cellulose & Inulin Heteropolysaccharides – mucopolysaccharides (Composition, structure and function)	Glycosides Isomerism of sugars Sugar derivatives	3 Lecture/ Practical
4	**Chemistry of lipids**	Definition,Modified Bloor's classification with examples. Biomedical importance of lipids Fatty acids – nomenclature and different types of classification Essential Fatty acids - Definition, examples and	Sources of dietary lipids	3 Lecture

		importance Phospholipids- classification, functions of phospholipids with clinical importance Glycolipids – Types and importance Amphipathic lipids -Definition, examples and importance		
5	**Chemistry of amino acids and Proteins**	Amino acids – Classification based on side chain properties, nutritional requirement and metabolic fate Biologically important peptides Proteins – Definition, Classification based on - (a) Chemical nature & solubility (b) Functions of proteins (c) Nutritional value	Structure function relationship of Proteins Hemoglobin, Collagen	4 Lecture
6	**Plasma proteins**	Definition, types & functions of plasma proteins Albumin – functions & clinical significance Acute phase proteins - Positive & Negative (functions & clinical significance)		1 Lecture/ Demonstration
7	**Connective tissue**	Composition and function of Extracellular matrix – Proteins (structure and functions of Collagen, elastin) and Proteoglycans.		1 Lecture
8	**Immunology**	Immunoglobulins – Structure, types & Functions		1 Lecture

9	**Chemistry of Nucleic acids**	Nitrogenous bases, Nucleosides and Nucleotides - examples, Importance Structure and function of DNA (B-DNA) Types of RNA (hnRNA, mRNA, rRNA, tRNA, SnRNA) with structure and functions		2 Lecture
10	**Enzymes**	Enzymes-Definition, IUBMB Classification. Coenzymes and Cofactors Enzyme specificity Mechanism of Enzyme action Factors affecting enzyme activity Enzyme inhibition - Competitive and Non-competitive inhibition with examples of clinical importance Allosteric inhibition Proenzymes Isoenzymes – Definition, diagnostic Importance Diagnostic and therapeutic importance of enzymes	Enzyme regulation by- Short term (Covalent modification, Zymogen activation, Allosteric regulation, Feedback regulation) and long term regulation (Induction and repression)	6 Lecture/ Case based learning
11	**Vitamins**	Definition, Classification Fat soluble vitamins (A,D,E,K), Vitamin C, Folic acid, Vitamin B12 – RDA,Sources, Metabolism, Biochemical functions, Deficiency manifestations Water soluble vitamins (B1, B2, B3, B6) - Biochemical functions, Deficiency manifestations.	Hypervitaminosis Antivitamins	8 Lecture and Case based learning

11	**Minerals**	Classification, Sources, RDA, Digestion and absorption, Homeostasis, Functions, Normal levels, Causes and features of hypo and hyper conditions of – Calcium, phosphorus, Iron, Fluoride, Iodine	Functions and disorders associated with - Copper, Zinc	4 Lecture
12	**Biological Oxidation**	High energy compounds Electron Transport Chain Organization, components. Oxidative Phosphorylation Inhibitors of Electron Transport chain Uncouplers		2 Lecture
13	**Carbohydrate metabolism**	Digestion, absorption of Monosaccharides, Uptake of glucose by different tissues PATHWAYS – Site, reactions, key steps, significance, energetics and regulation of - • Glycolysis • TCA cycle • Gluconeogenesis Amphibolic role of Citric acid cycle Cori's cycle Regulation of blood glucose levels in well fed condition and fasting. Key Steps and Significance of Glycogenesis, Glycogenolysis Significance of HMP shunt pathway Diabetes mellitus – types, metabolic changes, complications, evaluation of glycemic status	Glycogen storage disorders	6 Lecture/ Case based learning

14	**Lipid metabolism**	Digestion and Absorption of lipids Pathways Site, reactions, key steps, significance, energetics and regulation of Beta oxidation Ketogenesis, ketolysis Cholesterol – structure and functions Outlines of Cholesterol synthesis and breakdown Lipoprotein metabolism - Composition, Functions, formation and turnover Atherosclerosis Role of LDL in atherosclerosis Fatty liver and lipotropic factors	Lysosomal storage disorders	5 Lecture/ Case based learning
15	**Protein and amino acid metabolism**	Digestion and absorption of General Reactions Transamination, Deamination – Oxidative & non oxidative and their significance. Ammonia metabolism Urea cycle and its disorders **Aminoacid metabolism** Specialised products formed from tyrosine, Glycine and their importance Inborn errors of metabolism- enzyme defect, clinical features, lab test for diagnosis of– PKU, Alkaptonuria, Albinism	Significance of Serotonin & Melatonin, Nitric oxide Functions of One carbon transfer	5 Lectures
16	**Integration of metabolism**	Metabolic processes that take place in specific organs in the body in fed and fasting states.		1 Lectures

17	**Biochemical genetics**	Outline of DNA replication, Transcription, Translation and their inhibitors. Genetic Code and its characteristics Mutations - causes, types, Consequences with examples	Antimetabolites Cancer – Viruses, Oncogenes	3 Lecture
18	**Nutrition and dietetics**	BMR – Definition, Normal values, Factors affecting and biomedical importance SDA – Definition and its significance Nitrogen balance Balanced diet – definition, composition Nutritional importance of Carbohydrates, Lipids, Proteins Biological value of proteins Dietary fibres – definition, examples, functions Biochemical and clinical features of Kwashiorkor and Marasmus	Nutritional indices	3 Lecture
19	**Tissue Biochemistry**	Introduction to heme synthesis and degradation Heme metabolism Types of Hemoglobins Bilirubin metabolism and jaundice Bone Composition, List bone turnover markers	Hemoglobinopathies	2 Lectures/ Case based learning
20	**Organ function tests**	Liver Function Tests Renal Function tests Thyroid function tests	Gastric function tests	2 Lecture/ Case based learning

21	**Mechanism of hormone action**	Hormones – Definition, classification Second messengers – cyclic AMP, calcium, inositol triphosphate Mechanism of action of steroid hormones, epinephrine, glucagon, insulin		1
22	**Water and electrolyte balance**	Distribution of water and electrolytes in ICF and ECF Osmolality of ECF Regulation of water and electrolyte balance – RAS mechanism	Evaluation of electrolyte imbalance	1 Lecture
23	**Acid base balance**	Concept of Acids, Bases and buffers Regulation of pH of blood by buffers, respiratory and renal mechanisms Acidosis and alkalosis (metabolic and respiratory) – causes, compensatory mechanisms and lab findings	HH Equation and its application	2 Lecture
24	**Free Radicals and Antioxidants**	Free radicals and Reactive oxygen species (ROS): definition, types, generation of free radicals/ ROS Damaging effects of ROS on biomolecules, Lipid peroxidation Oxidised LDL and its effects. Anti-oxidant defense systems in our body Oxidative stress – role in cancer, complications of diabetes, atherosclerosis.	Fenton and Haber Weiss reactions	1 Lecture

25	**Detoxification**	Definition-Xenobiotics, Biotransformation **Phase –I reactions** Oxidation ,Hydroxylation (Cytochrome P450) **Phase-II reactions** Conjugation reactions- Glucuronic acid, Glutathione, Glycine	Oxygen toxicity	1 Lecture

Practical

Sr. No.	**Topic**	**Hours**
Qualitative experiments:		**30 hrs.**
1.	Lab safety and BMW management	2
2.	Sample collection, tubes, preservatives	2
3.	Qualitative analysis of carbohydrates	4
4.	Colour reactions of proteins and amino acids	4
5.	Identification of non-protein nitrogen substance	4
6.	Normal constituents of urine	4
7.	Abnormal constituents of urine	6
8.	Analysis of saliva including amylase	2
9.	Analysis of milk	2
Quantitative estimations:		**10 hrs.**
1.	Blood glucose estimation	2
2.	Serum total protein estimation	2
3.	Urine creatinine estimation	2
4.	Titrable acidity and ammonia in urine	2
5.	Free and total acidity in gastric juice	2
Demonstrations:		**4 hrs.**
1.	Paper electrophoresis	2
2.	ELISA, PCR	2

Charts/clinical data evaluation:		16 hrs.
1.	Glucose tolerance test profiles	2
2.	Serum lipid profiles	2
3.	Profiles of hypothyroidism and hyperthyroidism	2
4.	Profiles of hyper and hypoparathyroidism	2
5.	Profiles of liver function	2
6.	Profiles in kidney disorders	2
7.	Blood gas profile in acidosis/ alkalosis	2
8.	Vitamin deficiency disorders	2

A. Recommended Text books and Reference books: (Recent editions)

a. Rafi MD. Textbook of Biochemistry
b. U Satyanarayana. Biochemistry
c. DM Vasudevan, Textbook of Biochemistry
d. S.K.Gupta. Biochemistry
e. Dinesh Puri: Biochemistry for Dental students
f. T.N. Pattabhiraman. Textbook of Biochemistry and Laboratory manual and Practical Biochemistry

B. **Recommended reference books: (Recent editions)**

a. Lippincotts' Illustrated reviews – Biochemistry
b. Harpers' Illustrated Biochemistry
c. Tietz. Clinical Chemistry
d. Stryer. Biochemistry

Scheme of examination:

Internal assessment:

The continuing assessment examinations may be held frequently at least 3 times in a particular year and the average marks of these examinations should be considered. 10% of the total marks in each subject for both theory, practical and clinical examination separately should be set aside for the internal assessment examinations.

University Examination
Theory:

Marks distribution in each subject (Physiology and Biochemistry):

Each subject shall have a maximum of 200 marks.

Theory – 100
Practical – 100

Theory	**100**	**Practical**		**100**
University written exam	70	University Exam		90
Viva Voce	20			
Internal assessment	10	Internal assessment		10
Total	100			100

For Biochemistry University Theory paper: 35 marks

Type of Questions	**Number of Questions**	**Marks of Questions**	**Total Marks**
MCQ	05	01	05
Long Essay Type – preferably from chemistry and metabolism of carbohydrate, lipid and proteins, enzymes, fat soluble vitamins, minerals, liver and renal function tests.	01	08	08
Short Essay Type	03	04	12
Short Answer	05	02	10
		Grand Total	**35**

Practical: 45 Marks

1. One procedure for qualitative analysis =15 marks
2. One procedure for quantitative estimation =20 marks
3. Interpretation of Laboratory results in a given chart =10 marks

Total =45 mark

The following are suggested:

1. **Exercise 1: Qualitative experiment –15 Marks**

   Test procedures can be given randomly arranged

   (Qualitative analysis of Normal or Pathological constituents of Urine)

2. **Exercise 2: Quantitative estimation and interpretation – 20 Marks**

   Test procedures can be given.

   (Estimation of Blood glucose/Total protein/urine creatinine)

3. **Exercise 3: Case studies - 10 Marks**

   (From charts/Clinical data interpretations)

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HUMAN DENTAL ANATOMY, ORAL HISTOLOGY, EMBRYOLOGY AND PHYSIOLOGY

Aims and Objectives:

Oral & Maxillofacial Pathology is the specialty of Dentistry and Pathology that investigates the cause, nature, process and effects of the diseases affecting the oral and maxillofacial regions

Department of Oral Pathology is also involved in training the undergraduates in Oral Biology, a composite of basic Dental Sciences and their clinical applications which include components in the subject of Dental Morphology, Oral Embryology, and Oral Physiology. This is essential for understanding the histological basis of various dental treatment procedures.

Teaching hours:

Lecture Hours	– 100 Hours.
Practical Hours	– 180 Hours
Total	– 280 Hours

1. Theory topics

General Anatomy

- Muscles, Nerves and Arteries of the head and neck
- Venous & Lymphatic drainage of head & neck
- Salivary glands
- Temporomandibular joint

Oral Anatomy & Histology

- Development of Oral & Para Oral tissues including the process of Odontogenesis
- Structural, ultrastructural and functional study
    - Oral Mucosa
    - Salivary glands
    - Maxillary Sinus
    - Temporomandibular joint
    - Dental tissues – Enamel, Dentin, Cementum, Pulp, Periodontal ligament
    - Jaws

- Eruption & Shedding of Teeth
- Age changes in oral & dental tissues
- Basic Histopathologic Techniques
    - Processing of tissues for both light & electron microscopy
    - Routine staining in detail
    - Special stains in brief
    - Preparation of ground and decalcified sections
    - Histochemistry in brief

Dental Anatomy / Morphology

- Introduction, Definitions, Nomenclature & Tooth numbering systems
- Morphology of primary & permanent dentition
- Differences between permanent & deciduous dentition
- Occlusion

Oral Physiology

- Formation and functions of saliva
- Mastication & deglutition
- Calcium & phosphorus & Fluoride Metabolism
- Theories of Mineralization
- Taste

2. Practical Sessions: Slides, specimens and casts shown & discussed
Work done

- Identification of fixed focus slides and drawing them
- Wax carving of geometric form and all permanent teeth
- Age estimation with the help of plaster models
- Identification of permanent and deciduous teeth

OBJECTIVES

After a course on Oral Biology, the student is expected to appreciate the normal development, morphology, structure & functions of oral tissues & variations in different pathological states.

I. TOOTH MORPHOLOGY

1. Introduction to tooth morphology
   - Human dentition, types of teeth & functions, Palmer's & Binomial notation systems, tooth surfaces, their junctions – line angles & point angles, definition of terms used in dental morphology, geometric concepts in tooth morphology, contact areas & embrasures – Clinical significance.

2. Morphology of permanent teeth
   - Description of individual teeth, along with their endodontic anatomy & including a note on their chronology of development, differences between similar class of teeth & identification of individual teeth.Variations & Anomalies commonly seen in individual teeth.

3. Morphology of Deciduous teeth
   - Generalized differences between Deciduous & Permanent teeth.
   - Description of individual deciduous teeth, including their chronology of development, endodontic anatomy, differences between similar class of teeth & identification of individual teeth.

4. Occlusion
   - Definition, factors influencing occlusion – basal bone, arch, individual teeth, external & internal forces & sequence of eruption
   - Inclination of individual teeth – compensatory curves
   - Centric relation & Centric occlusion – protrusive, retrusive & lateral occlusion
   - Clinical significance of normal occlusion
   - Introduction to & classification of malocclusion

II. ORAL EMBRYOLOGY

1. **Brief review of development of face, jaws, lip, palate & tongue with applied aspects**
2. **Development of teeth.**
   - Epithelial mesenchymal interaction, detailed study of different stages of development of crown, root & supporting of tooth & detailed study of formation of calcified tissues
   - Applied aspects of disorders in development of teeth

3. **Eruption of deciduous & Permanent teeth**
   - Mechanisms in tooth eruption, different theories & histology of eruption, formation of Dentogingival junction, role of Gubernacular cord in eruption of permanent teeth.
   - Clinical or Applied aspects of disorders of eruption

4. **Shedding of teeth**
   - Factors & mechanisms of shedding of deciduous teeth
   - Complications of shedding

III. ORAL HISTOLOGY

1. Enamel, Dentine, Cementum & Pulp tissue
   - Detailed microscopic study of enamel, dentine, Cementum & pulp tissue. Age changes & applied aspects (clinical significance) of histological considerations – Fluoride applications, transparent dentine, dentine hypersensitivity, reaction of pulp tissue to varying insults to exposed dentine; Pulp calcifications & Hypercementosis

2. Periodontal Ligament & Alveolar Bone
   - Detailed microscopic study of Periodontal ligament & alveolar bone, age changes, histological changes in periodontal ligament & bone in normal & orthodontic tooth movement, applied aspects of alveolar bone resorption

3. Oral Mucosa
   - Detailed microscopic study of Oral Mucosa, variation in structure in relation to functional requirements, mechanisms of keratinisation, clinical parts of gingiva, Dentogingival & Muco-cutaneous junctions & lingual papillae. Age changes & clinical considerations

4. Salivary Glands
   - Detailed microscopic study of acini & ductal system
   - Age changes & clinical considerations

5. Temporomandibular Joint
   - Review of basic anatomical aspects & microscopic study & clinical considerations

6. Maxillary Sinus
    - Microscopic study, anatomical variations, functions & clinical relevance of maxillary sinus in dental practice

7. Processing of hard & soft tissues for microscopic study
    - Ground sections, decalcified sections & routine staining procedures

8. Basic histochemical staining patterns of oral tissues

IV. ORAL PHYSIOLOGY

1. Saliva
    - Composition of saliva – Variations, formation of saliva & mechanisms of secretion, salivary reflexes, brief review of secretomotor pathway, functions, role of saliva in dental caries & applied aspects of hyper & hypo salivation

2. Mastication
    - Masticatory force & its measurement – need for mastication, peculiarities of masticatory muscles, masticatory cycle, masticatory reflexes & neural control of mastication

3. Deglutition
    - Review of the steps in deglutition, swallowing in infants, neural control of deglutition & dysphagia

4. Calcium, Phosphorous & Fluoride metabolism
    - Source, requirements, absorption, distribution, functions & excretion, clinical considerations, hypo & hypercalcaemia & hyper & hypo phosphatemia & fluorosis

5. Theories of Mineralization
    - Definition, mechanisms, theories & their drawbacks
    - Applied aspects of physiology of mineralization, pathological considerations – calculus formation

6. Physiology of Taste
    - Innervation of taste buds & taste pathway, physiologic basis of taste sensation, age changes & applied aspects – taste disorders

PRACTICAL

A. Histology slides (46)

Odontogenesis

1. Enamel organ (Bud stage & Late cap stage)
2. Tooth bud (Early cap stage)
3. Early bell stage(5x10)
4. Early bell stage
5. Late bell stage (5x10)
6. Late bell stage

Enamel

1. Complete striae
2. Perikymata & Imbrication Lines of Pickerill
3. Neonatal line
4. Dentino – Enamel Junction
5. Enamel lamellae & Enamel tufts
6. Enamel – spindles

Dentin

1. Primary curvatures
2. Secondary curvatures
3. Primary & secondary dentin
4. Interglobular dentin
5. Tomes granular layer
6. Dead tracts

Cementum

1. Cellular Cementum
2. Sharpeys' fibers & Cementum
3. Incremental lines of Salter
4. Overlap junction (cementoenamel junction)
5. Gap junction (cementoenamel junction)
6. Butt junction (cementoenamel junction)
7. Hypercementosis

Pulp

1. Coronal pulp
2. Radicular pulp
3. Free false stones

Periodontal ligament

1. Horizontal & oblique group pf fibers
2. Alveolar crest fibers & dentogingival fibers

Salivary gland

1. Serous salivary gland (Parotid)
2. Predominantly serous salivary gland (submandibular gland)
3. Predominantly mucous salivary gland (sublingual gland)
4. Mucous gland (minor salivary gland)

Oral mucosa

1. Hard palate: (anterolateral part)
2. Gingiva
3. Soft palate
4. Tongue (Filliform papillae)
5. Tongue (Fungiform papillae)
6. Tongue (Circumvalate papillae)
7. Lip (mucocutaneous junction)
8. Dentogingival junction
9. Skin

Bone

1. Mature bone (decalcified, H & E stained)
2. Mature bone (ground section)
3. Woven bone (decalcified, H & E stained)

Maxillary sinus

1. Histology of the maxillary sinus

B. Specimens

1. Permanent teeth – 16
2. Deciduous – 10

C. Models

1. Plaster models - 15
    - Deciduous dentition
    - Mixed dentition
    - Permanent dentition
2. Acrylic tooth models – 32
3. Acrylic teeth set (deciduous & permanent)

SKILLS

1. The student should acquire basic skills in
2. Carving of crowns of permanent teeth in wax
3. Microscopic study of oral tissues
4. Identification of deciduous & permanent teeth
5. Age estimation by patterns of teeth eruption from plaster casts of different age groups

Recommended Text and Reference books, Journals and Atlases

a. Orban's Oral Histology & Embryology -- S N Bhaskar
b. Oral Histology – Development, Structure & Functions -- A R Tencate
c. Wheeler's Dental Anatomy, Physiology & Occlusion – Major M Ash
d. Dental Anatomy – its relevance to dentistry- Woelfel & Scheid
e. Applied Physiology of the mouth- Lavelle
f. Physiology & Biochemistry of the tooth – Jenkins

Theory topics

Sl no	Theory Topics	Duration
1	Introduction, Nomenclature, Tooth numbering system	3 Hours
2	Morphology of Incisors	4 Hours
3	Odontogenesis	7 Hours
4	Enamel & Amelogenesis	7 Hours
5	Dentin & Dentinogenesis	5 Hours
6	Morphology of Canines	3 Hours
7	Pulp	3 Hours
8	Cementum & Cementogenesis	3 Hours
9	Periodontal ligament	4 Hours
10	Morphology of Premolars	4 Hours
11	Alveolar bone	3 Hours
12	Maxillary sinus	2 Hours
13	TMJ	3 Hours
14	Salivary glands	5 Hours
15	Saliva	3 Hours
16	Oral mucosa	9 Hours

17	Eruption and Shedding	3 Hours
18	Morphology of Molars	5 Hours
19	Calcium and phosphorus metabolism	2 Hours
20	Theories of mineralization	3 Hours
21	Morphology of Deciduous dentition	5 Hours
22	Occlusion	3 Hours
23	Mastication	2 Hours
24	Deglutition	1 Hour
25	Internal anatomy of Pulp	1 Hour
26	Processing & Histochemistry	3 Hours

Practical topics

Sl no	Practical Topics	Duration
1	Introduction	2 Hours
2	Geometric form I & II	10 Hours
3	Carving of Incisors	18 Hours
4	Study of Odontogenesis (slides)	6 Hours
5	Study of Enamel (slides)	6 Hours
6	Study of Dentin (slides)	6 Hours

7	Carving of Canines	12 Hours
8	Study of Pulp (slides)	6 Hours
9	Study of Cementum (slides)	6 Hours
10	Study of Periodontal ligament (slides)	6 Hours
11	Carving of Premolars	18 Hours
12	Study of Alveolar bone (slides)	6 Hours
13	Study of Maxillary sinus (slides)	3 Hours
14	Study of Salivary glands (slides)	6 Hours
15	Study of Oral mucosa (slides)	12 Hours
16	Morphology of Molars	15 Hours
17	Study of Deciduous dentition	6 Hours
18	Study of tooth morphology with the help of specimen	6 Hours
19	Study of tooth morphology with the help of casts	6 Hours
20	Processing & Histochemistry	3 Hours

Scheme of examination:

Theory:

Year / Internal Assessment (I.A)	Type of question / Duration		No. of questions	Marks	Total marks
1st BDS / 3 Internal Assessment	Long Essay	3 Hrs.	2	8	70
	Short Essay		6	4	
	Short Notes		10	2	
	MCQ's		10	1	
	Viva voce		-	-	30

Practicals:

Year /Internal assessment (I.A)	Spotter	Marks	Total no.	Total marks
1st BDS / 3 Internal Assessment	Slides (13)	3	20	60
	Models (1) & Casts (2)			
	Specimens (4) (1 Hr.)			
	Tooth carving (1 Hr.)	30	1	30
	Record: Dental Anatomy	5		10
	Record: Dental Histology	5		

Final examination: Pattern of Marks distribution

Theory		Practical	
Theory paper	**70 Marks**	**Spotter [20 x 3]**	**60 Marks**
1. Long Essay [2x8]	16 Marks	1. 13 slides	
2. Short Essay [6x4]	24 Marks	2. 1 Model & 2 casts	
3. Short Answer [10x2]	20 Marks	3. 4 Specimens	
4. MCQ's [10x1]	10 Marks		
Viva voce	**20 Marks**	**Tooth carving**	**30 Marks**
Internal assessment	**10 Marks**	**Internal assessment**	**10 Marks**
Total	**100 Marks**	**Total**	**100 Marks**

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DENTAL MATERIAL

Aims and Objectives

DENTAL MATERIAL

The science of Dental Material has undergone tremendous changes over the years. Continued research has led to new material systems and changing concepts in the dental field. Interlinked with various specialised branches of chemistry, practically all engineering applied sciences and biological characteristics, the science of dental material emerged as basic sciences in itself with its own values and principles.

AIMS

Aim of the course is to present basic chemical and physical properties of Dental materials as they are related to its manipulation to give a sound educational background so that the practice of the dentistry emerged from art to empirical status of science as more information through further research becomes available. It is also the aim of the course of Dental materials to provide with certain criteria of selection and which will enable to discriminate between facts and propaganda with regards to claims of manufactures.

OBJECTIVES

To understand the evolution and development of science of dental material. To explain purpose of course in dental materials to personnels concerned with the profession of the dentistry. Knowledge of physical and chemical properties. Knowledge of biomechanical requirements of particular restorative procedure. An intelligent compromise of the conflicting as well as co-coordinating factors into the desired Ernest. Laying down standards or specifications of various materials to guide to manufacturers as well as to help professionals. Search for newer and better materials which may answer our requirements with greater satisfaction. To understand and evaluate the claims made by manufactures of dental materials.

NEED FOR THE COURSE

The profession has to rise from an art to a science, , the need for the dentist to possess adequate knowledge of materials to exercises his best through knowledge of properties of different types of materials. The growing concern of health hazards due to mercury toxicity, inhalation of certain vapour or dust materials, irritations and allergic reaction to skin due to contact of materials. Materials causing irritation of oral tissues, pH of restorative materials causing inflammation and necrosis of pulp

which is a cause for the dentist to possess wider knowledge of physical, chemical and biological properties of materials being used. For the protection for the patient and his own protection certain criteria of selection are provided that will enable the dentist to discriminate between facts and propaganda, which will make a material biologically accept.

SCOPE

The dental material is employed in mechanical procedures including restorative dentistry such as Prosthodontics, endodontics, periodontal, orthodontics and restorative materials. There is scarcely a dental procedure that does not make use of dental materials in one form or another and therefore the application of dental material is not limited to any one branch of dentistry. Branches such as minor surgery and periodontics require less use of materials but the physical and chemical characters of materials are important in these fields. The toxic and tissue reaction of dental materials and their durability in the oral cavity where the temperature is between 32 & 37 degree centigrade, and the ingestion of hot or cold food ranges from 0- 70 degree centigrade. The acid an alkalinity of fluids shown pH varies from 4 to 8.5. The load on 1 sq. mm of tooth or restorative materials can reach to a level as high as many kilograms. Thus the biological properties of dental materials cannot be separated from their physical and chemical properties.

Teaching hours:

Lecture Hours – 10 hrs.
Practical Hours – 20 hrs.
Total – 30 hrs.

Theory

Sr. No.	Topic	Teaching methodology with hours
1	**Introduction** Aim, Objectives, Scope and Applications in clinical and laboratory	01
2	**Structure and behavior of matter** Brief introduction to enamel, dentin, polymers, metals, alloys, ceramics, composites and standardization of Dental materials	01
3	**In elastic impression materials** Impression plaster, impression compound	02

4	**Gypsum products** Cast and model materials	02
5	**Denture base resins** Tray materials, self-cure acrylic and heat cure acrylic resin materials, technical consideration in processing.	03
6	Dental waxes, base plate wax, beading and boxing wax, sticky wax and carding wax	01

Practical

Sr. No	Topic	Hours
1	Aim, Objectives, Scope and Applications in clinical and laboratory	1
2	Demonstration for manipulation of Gypsum products	1
3	Manipulation of Gypsum products – Preparation for cubes and rectangles	6
4	Comparative studies of different gypsum products	1
5	Demonstration for Manipulation of impression compound	1
6	Manipulation of impression compound	6
7	Demonstration for Manipulation of Alginate impression material	1
8	Manipulation of Alginate impression material	3

Recommended Text and Reference books, Journals and Atlases

a. Phillips science of dental materials - Kennith J, Anusavice, 12th Edition, 2014 Reed Elsevier India
b. Dental materials and their selection - William J O'Brien, 4th Edition, 2008, Quintessence Books
c. Restorative Dental Materials - Robert Craig, 11th Edition, 2008, Mosbo Elsvier
d. Dental Materials properties and manipulation - John M Powers, John Wataha, 9thEdition 2008, Mosby
e. Materials in Dentistry Principals and Application - Jack L Ferracaine, 2nd Edition, 2001, J B Lippincot Publication

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PRECLINICAL PROSTHODONTICS

Aims:

To train dental graduates so as to ensure higher competence in complete denture prosthodontics and prepare a candidate for identifying and steps involved in fabrication of complete denture.

Objectives:

- To acquire adequate knowledge and understanding of applied basic science in complete denture prosthodontics.
- To develop preclinical skills towards fabrication of complete denture with respect to delivering comprehensive care to patients.

Teaching hours:

Practical Hours – 276 hrs.

Teaching schedule for Practicals

Sr. No.	Topics	Hours
1.	Introduction to Preclinical Prosthodontics	03
2.	Marking of maxillary and mandibular anatomical land marks - Demo	03
3.	Marking of maxillary and mandibular anatomical land Marks	03
4.	Impression making – Demo	03
5.	Impression making	06
6.	Making of primary cast – Demo	03
7.	Making of primary cast	06
8.	Undercut block out and spacer designing – Demo	03
9.	Undercut block out and spacer designing	06
10.	Making of Special tray – Demo	03
11.	Making of Special tray	06
12.	Making of Record base – Demo	03
13.	Making of Record base	06
14.	Making of occlusal rims – Demo	03

15.	Making of occlusal rims	12
16.	Mounting of occlusal rims – Demo	03
17.	Mounting of occlusal rims	06
18.	Anterior teeth arrangement – Demo	03
19.	Anterior teeth arrangement	06
20.	Posterior teeth arrangement – Demo	03
21.	Posterior teeth arrangement	06
22.	Waxing and carving of trial dentures - Demo	03
23.	Waxing and carving of trial dentures	06
24.	Flasking of dentures – Demo	03
25.	Flasking of dentures	06
26.	Acrylization of dentures – Demo	03
27.	Acrylization of dentures	06
28.	Finishing and polishing of dentures - Demo	03
29.	Finishing and polishing of dentures	06
30.	Denture submission	06

Note: Batch A = 138hrs,
Batch B = 138hrs,
Total = 276 hrs.

Recommended Text and Reference books, Journals and Atlases

a. Prosthodontic Treatment of Edentulous Patients, XI Edition, Boucher 1997, Mosby St. Louis, Missouri, USA
b. Syllabus of Complete Denture, Heartwell, IV Edition, 1992, Varghese Publishing House
c. Theory and Practice of Fixed Prosthodontics, Tylman, VIII Edition, 1993, Ishiyaku Euro America Inc. 716, Hanley Industrial Court St. Louis Missouri, USA
d. Removable Partial Denture, McCracken, VIII Edition, 1986, CBS Publishers & Distributors Shadara, Delhi
e. Text book of Prosthodontics, Deepak Nallaswamy Veeraiyan, II Edition,2017, JP Publications
f. Science of Dental Materials, Skinner, X Edition, 1996, W.B Saunders Company, Philadelphia, USA

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SDM College of Medical Sciences & Hospital

SDM College of Dental Sciences & Hospital

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SDM Institute of Nursing Sciences

Shri Dharmasthala Manjunatheshwara University

SDM Research Institute for Biomedical Sciences

Panoramic View of Campus