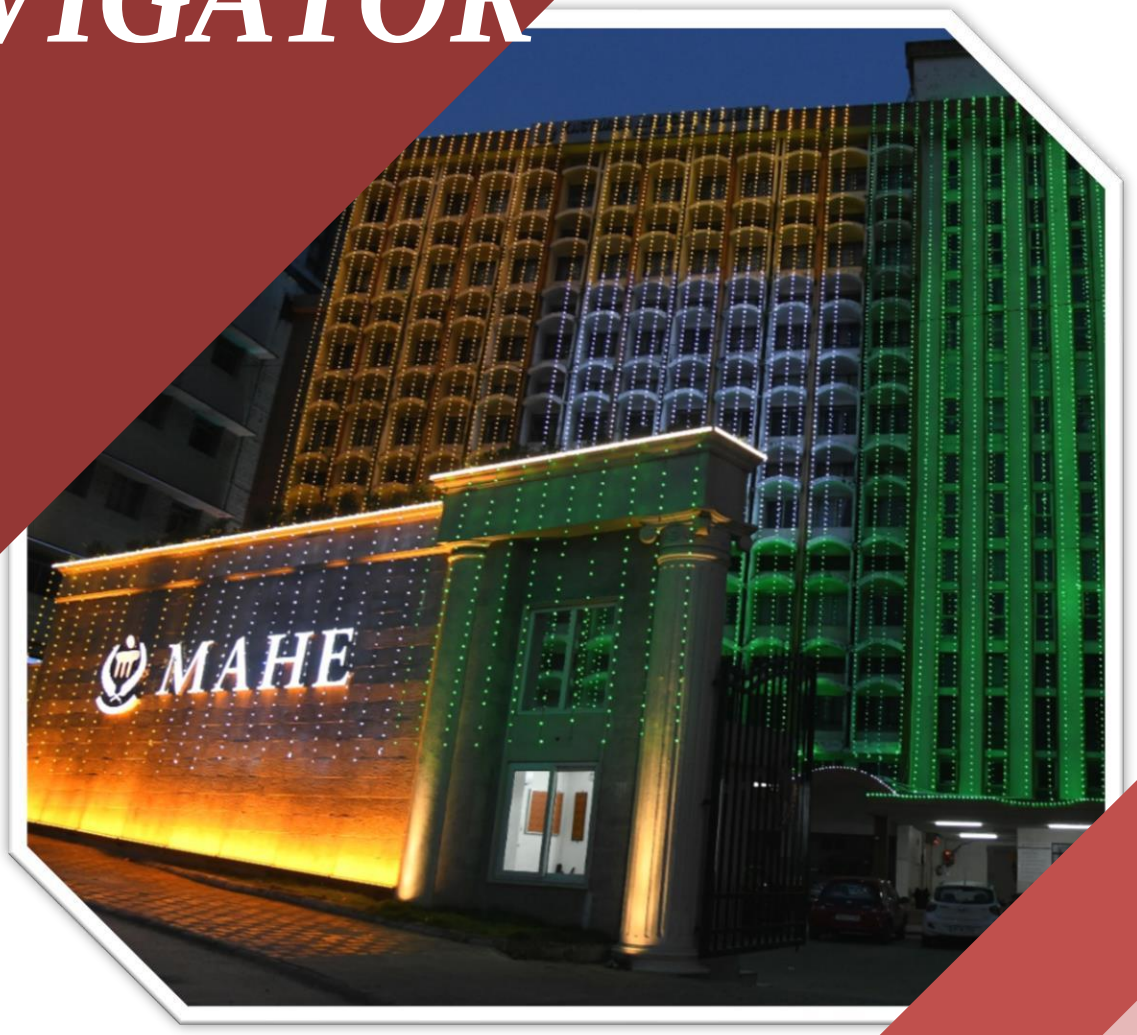
NAVIGATOR



MANIPAL COLLEGE
OF DENTAL SCIENCES
MANGALORE
(A constituent unit of MAHE, Manipal)

Information Booklet for First BDS Students
2024-25

MANIPAL
ACADEMY of HIGHER EDUCATION

(Deemed to be University under Section 3 of the UGC Act, 1956)

The Manipal Academy of Higher Education (MAHE), established in 1993 under Section 3 of the UGC Act 1956, Government of India has 28 constituent institutions comprising Medical, Dental, Engineering, Architecture, Nursing, Allied Health, Pharmacy, Management, Communication, Information science, Hotel Management, Biotechnology, Regenerative Medicine , Law and Design. The university offers Bachelors, Masters and Doctoral degrees in various specialties. Among the above, the flagship institutions, viz. KMC, Manipal, Mangalore and Manipal Institute of Technology, Manipal have completed more than 60 years of service to the society in the field of medicine, health care and engineering. The Union Ministry of Human Resource Development (HRD) has granted Institution of Eminence (IoE) status to Manipal Academy of Higher Education, Manipal in 2018.

The professional institutions were granted deemed university status because of their superlative track record and academic excellence. Today, Manipal Academy of Higher Education boasts of students representing 53 countries. The university is accredited with "A++" grade according to the National Assessment and Accreditation Committee (NAAC). The university provides quality education to over 40,738 students admitted to one of the 554 courses which the university provides through its 28 institutes. It also has an active alumni base of over 2,31,452 students across the world.

Manipal Academy of Higher Education, has been selected as the Institution of Eminence by the Government of India. According to the Quacquarelli Symonds University World Rankings 2022, MAHE has figured in the 751-800 band, which is the best for a private Indian university. In the Times Higher Education World University Rankings, MAHE figures in 801-1000 category. Besides being an ISO 9001 :2015 and ISO 14001 :2015 certified University, it is home to many top 10 ranked institutions of India. In NIRF ranking 2023 the university is ranked 7th position in India.

Manipal Group of institutions are located on scenic campuses, which provide a high quality lifestyle and an ideal environment for study. All campuses have excellent infrastructure for academic activities, sports and other extracurricular activities. Manipal Academy of Higher Education (MAHE) has been compared with Nalanda of yore for its excellent academic reputation, experienced and dedicated faculty, outstanding clinical facilities, and a world-class environment that supports education.

MANIPAL
ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

The Manipal Academy of Higher Education and Medical group has invested 6 decades of pioneering work in the social sector. The group has ventured beyond the boundaries created by history, geography, nationality, gender, social and economic development and has found opportunities in education and health care.

VISION

Global leadership in human development, excellence in education and healthcare.

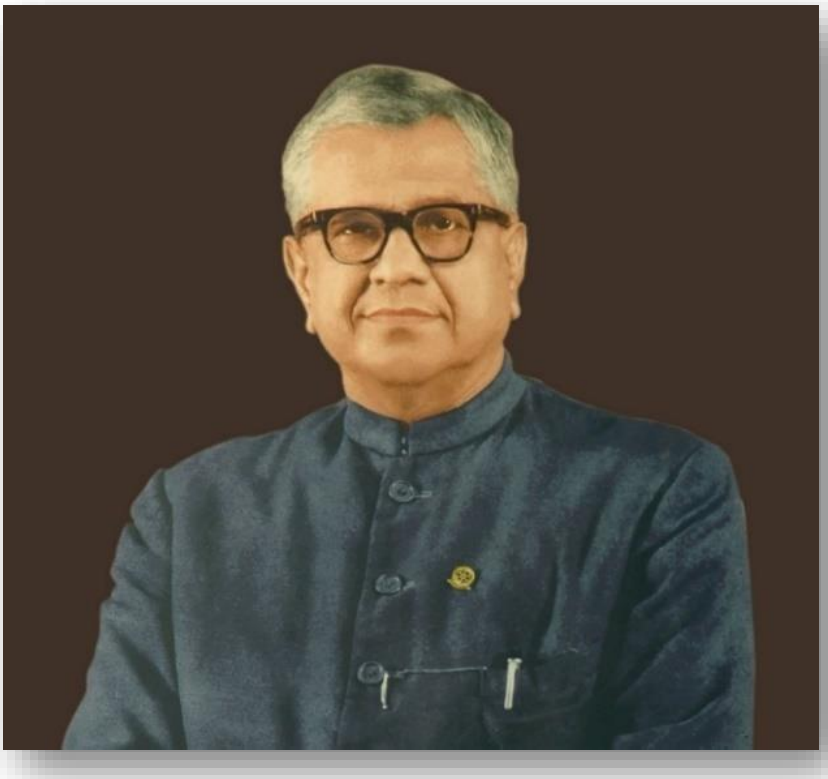
MISSION

- Be the most preferred choice of students, faculty and industry.
- Be in the top 10 in every discipline of education, health sciences, engineering and management.

MANIPAL VALUES

- Integrity
- Transparency
- Quality
- Team work
- Execution with passion
- Humane touch

THE FOUNDER



The late Dr. Tonse Madhava Anantha Pai (1898 - 1979), physician, educationist, banker and philanthropist, is the founder and builder of modern Manipal. He established educational, medical, banking and industrial enterprises of national importance and repute.

Manipal is an eloquent testimony to the vision, motivation and labour of Dr. T.M.A. Pai. His zeal, dedication and infinite energy inspired others, motivating them for collective effort. This was the spirit of Dr. T.M.A .Pai. This is the spirit of Manipal. "We must have a residential university in Manipal", were Dr. T.M.A. Pai's prophetic words.

The aspiration of late Dr. T.M.A. Pai to turn Manipal into a university town, after his success in establishing a string of secondary schools and colleges of humanities and the crowning achievement of starting a medical college on public private partnership basis (the first of its kind in India), was realized in 1993 with the conferment of a deemed university status on Manipal Academy of Higher Education.

ADMINISTRATORS

Dr. Ramdas M Pai
Chancellor

Dr. H S Ballal
Pro-Chancellor

Lt. Gen. (Dr.) M.D.Venkatesh
Vice Chancellor

Dr. Sharath Rao
Pro-Vice Chancellor
Health Sciences

Dr. Dilip G. Naik
Pro-Vice Chancellor
Mangalore Campus

Dr. Narayana Sabhahit
Pro-Vice Chancellor
Technology & Science

Dr. Madhu Veeraraghavan
Pro-Vice Chancellor
Management, Law, Humanities and Social Sciences

Dr. P. Giridhar Kini
Registrar

Dr. Geetha M
Director-Student affairs

MCODS, MANGALORE ADMINISTRATORS

Dr. Junaid Ahmed
Associate Dean

Dr. Ashita Uppoor
Dean

Dr. Arathi Rao.
Associate Dean

Heads of Department- MCODS Mangalore

Dr Ravikiran Ongole
(Oral medicine and Radiology)

Dr Dharnappa Poojay
(Oral and Maxillofacial Surgery)

Dr Karthik Shetty
(Conservative Dentistry and Endodontics)

Dr Neetha J Shetty
(Periodontics)

Dr Suprabha B S
(Pediatric and Preventive Dentistry)

Dr Supriya Nambiar
(Orthodontics and Dentofacial Orthopaedics)

Dr Thilak Shetty B
(Prosthodontics and Crown and Bridge)

Dr Ramya Shenoy
(Public Health Dentistry)

Dr Srikant N
(Oral Pathology and Microbiologyy)

Dr Prashanthi Madhyastha
(Dental Materials)

Heads of Department- KMC Mangalore

Dr Rajanigandha Vadagaonkar
(Anatomy)

Dr Anupama N
(Physiology)

Dr Rukmini M S
(Biochemistry)

ADMINISTRATORS MESSAGE

DR. SHARATH RAO

PRO VICE CHANCELLOR (MEDICAL AND DENTAL)

Dear Students,

Heartiest congratulations! Welcome to the Manipal Family. You are embarking on a transformative journey, transitioning from the confines of school to the realm of professional education. We are elated that you have chosen MCODS, Mangalore, one of the esteemed Dental Schools, as the launchpad for your career aspirations.

The curriculum has been meticulously crafted to equip you for success in the dynamic, ever-evolving domain of dentistry. Within the embrace of exceptional infrastructure and dedicated faculty, you will amass the essential knowledge, skills, and attitudes, paving the way for you to become a skilled and empathetic dentist in the years to come. The college also opens avenues for co-curricular and extracurricular pursuits, nurturing holistic development.

Undoubtedly, your time at this institute will be among the most cherished chapters of your life. Forge new friendships and capitalize on the academic, social, and cultural prospects that you shall encounter. Your unwavering dedication is pivotal to your achievements. We earnestly anticipate that your stay here will be marked by enriching experiences and joyful reminiscences.

Here's to a future that gleams brightly with success and promise.

DR. DILIP G. NAIK

PRO VICE CHANCELLOR (MANGALORE CAMPUS)

The Manipal Academy of Higher Education boasts a rich legacy of delivering exceptional professional education. Heartfelt congratulations are in order for securing a spot in the B.D.S. program at Manipal College of Dental Sciences, Mangalore—a distinguished institution under the Manipal Academy of Higher Education umbrella and a pre-eminent dental establishment in India. I am filled with immense pride as I affirm that Manipal College of Dental Sciences, Mangalore, stands as a towering presence among the most esteemed dental colleges in the country, securing a notable position within the top ten dental institutions nationwide.

As you step into this new chapter, I encourage you to not only excel academically but also embrace a holistic approach to life. Engage in the array of co-curricular and extra-curricular activities that Manipal Academy of Higher Education provides, allowing you to cultivate a well-rounded perspective . On behalf of the university, it is my privilege to extend a warm welcome to you, as you join the vast and continuously expanding community of students who have been profoundly influenced and shaped by the enduring "Manipal" spirit.

May your journey be marked by joy, learning, and indelible memories during your time at MCODS, Mangalore.

MESSAGE FROM THE DEAN

DR. ASHITA UPPOOR

DEAN

Manipal College of Dental Sciences, Mangalore

Across more than three decades since its establishment, Manipal College of Dental Sciences (MCODS), Mangalore has consistently played a pivotal role in advancing the field of dentistry. Throughout these years, its remarkable growth has firmly positioned it as a premier dental institution synonymous with academic excellence in India. This distinction is underscored by its impressive rankings in esteemed survey assessments of dental colleges within the country.

On behalf of the dedicated management, esteemed faculty, and committed staff of MCODS Mangalore, I extend a heartfelt welcome to each of you as you embark on a promising journey of dental undergraduate studies that will culminate in the award of the coveted degree of Bachelor of Dental Surgery (BDS).

As a vital component of Manipal Academy of Higher Education, MCODS Mangalore boasts an impressive history of shaping dental students into standout individuals who excel in various dental post-graduate entrance examinations, securing admissions to esteemed international universities. Graduates hailing from MCODS, Mangalore have proven themselves as accomplished practitioners of exceptional dentistry, both within India and on a global scale. The adept teaching faculty at MCODS, Mangalore actively foster and imbue the spirit of continuous learning within their students.

This informational handbook, appropriately titled "Navigator," is designed to guide the incoming BDS students through the regulations of this institution and the intricate facets of the BDS course. It delves into examination patterns, subjects of study, evaluation methods, syllabus coverage, and clinical training, among other aspects. Undoubtedly, this resource will serve as a dependable companion throughout your entire BDS program.

I'm optimistic that your journey at MCODS, Mangalore, combined with your stay in this captivating coastal city, will unfold as an enriching experience, mirroring the transformative path taken by numerous students who have walked these halls before you. May your stay in Mangalore be brimming with happiness and fruitful pursuits.

MANIPAL COLLEGE OF DENTAL SCIENCES, MANGALORE
A constituent unit of MAHE, Manipal

INTRODUCTION

Founded in 1987, MCODS, Mangalore (a constituent college of Manipal Academy of Higher Education, Manipal) is the country's first dental college to admit 100 students to BDS course from the very first year of inception along with simultaneous commencement of postgraduate programmes. MCODS, Mangalore follows the guidelines of Dental Council of India and was recognized by it in the year 1991. Manipal Academy of Higher Education is accredited with highest A grade by the National Assessment and Accreditation Committee (NAAC). The institute follows the ISO 9001:2015 and 14001:2015 standards, imparting quality health care to patients as well as excellent education to students.

COURSES OFFERED

The institute offers undergraduate, postgraduate, diploma and certificate programmes in various branches of dentistry. The College offers innovative certificate courses in Restorative Dentistry, Cone Beam Computerized Tomography, Forensic Odontology, Minor Oral Surgery Procedures, Modern endodontics and Microimplants for anchorage. Our institute has started Centres for Dental Advanced Education, Tobacco Cessation,Forensic Odontology and Centre for Digital dentistry. Additional Centres are being planned for caries research, pain alleviation, maxillofacial prosthesis, cleft palate, oral systemic link and oral cancer

RECOGNITIONS AND ACCREDITATIONS [RANKINGS]

As per the survey results by the nationally acclaimed magazines, the institute is one among the top 5 private colleges of India (India Today Ranking 2024 – 2nd among the top private colleges and 10th overall, Outlook India 2024– 3rd among private colleges and 7th overall ranking, Week Magazine 2024 – 2nd among private and 8th overall). The institution has secured 11th rank in the National Institute Ranking Framework conducted by MHRD in 2024. Under QS ranking in the subject of Dentistry Manipal Academy of Higher Education was ranked in the 51-100 band (QS ranking band)

ACADEMICS

Our institute has recently upgraded the curriculum to an outcome-based education system which will modify the curriculum delivery from a teacher-centric to a student-centric mode. The assessment is also integrated with a software InPods which gives the analytics of the individual student performance as well as mapping with the course and programme outcomes. The curriculum has been designed in accordance with the syllabus prescribed by the Dental Council of India (DCI). The core courses are the Bachelor's and Master's degrees in Dental Surgery. The institute has enabled the use of the online learning management system (LMS) via Impartus as well as the Brightspace platform and Impartus lecture capture system, which facilitates the delivery of the course content in the form of videos, demonstrations, lectures, powerpoint slides, PDF's etc. The curriculum supports the use of innovative teaching modalities of 'flip classroom', small group teaching, student-directed learning etc. The evaluation has been divided into formative and summative assessments and the practical assessment utilizes the Objective Structured Practical and Clinical Examination systems. (OSPE/OSCE). The university has subscribed to the "Course era" platform which delivers free online courses on a variety of subjects, thus utilizing the Massive Online Open Course systems (MOOC's).

INFRASTRUCTURE

MCODS, Mangalore is spread over two locations, conveniently accessible in the city, namely Light House Hill Road and Bejai with dedicated facilities in each of them. A total of 311 dental chairs, state-of-the-art dental equipment, centrally air-conditioned library, modern air-conditioned lecture halls and continuing professional development (CPD) rooms with audio-visual aids, phantom head simulation laboratories for preclinical training and access to the newer generation of dental materials ensure delivery of optimal training to the undergraduate and postgraduate students. The institute has a mobile dental clinic with two automated dental units that render treatment in peripheral nodal centres and areas with limited access to dental care. MCODS, Mangalore successfully conducted 667 dental camps screening and treating 21212 patients in the year 2023. The institute also provides segregated hostel facilities for both male and female students with transport provided from the hostels to the institute. The 3D Cone Beam Computerized Tomography (3D CBCT) in our college is the first fully loaded system installed in the country. The Surgical Skills Laboratory, the first of its kind in a dental institute in India, has life-size mannequins for hands-on preclinical training in injection techniques (local anaesthesia, IM/IV), tooth extraction, suturing techniques and basic life support. The state of the art

surgical microscope and the CAD-Cam equipment are the new equipments added to the inventory of MCODS, Mangalore.

FACULTY

REGULAR FACULTY

The dedicated teaching faculty are updated with recent advances in dentistry and contribute to the dental scientific temper by way of research, grants, publications in various international and national journals (151 indexed publications in 2023) and scientific presentations at various international and national fora (159 national and 10 international presentations by faculty and students in 2023). Our researchers have received a grant of ₹52 lakhs in the last 6 years from various national and international bodies. The faculty has found a permanent place in the field of dentistry by being authors of books that are sought after by students in India and abroad. The consistently excellent performance of our students who achieve top ranks in various national competitive postgraduate examinations and those studying further in international universities is a surrogate marker and testament of the high quality of training offered to the students of MCODS, Mangalore.

INTERNATIONAL ADJUNCT FACULTY

Collaboration and constant upgradation of the skills practiced globally is a must for holistic development of the student as well as the faculty. In this regard we have international adjunct faculty which include faculty from University of Wester, Sydney, Australia and University of Turku, Finland

RESEARCH AND INNOVATIONS

MCODS Mangalore encourages research, innovation, research publication, patent filing and technology commercialization at undergraduate and postgraduate level. We have collaborative and interdisciplinary research programs in association with premier research laboratories and have secured research grants from government both state and central (VGST, ICMR), industries and international funding agencies. The faculty members of MCODS Mangalore hold a record of being the foremost amongst Indian dental institutions in authoring textbooks that are preferred and recommended reading at most Dental Colleges in India. These include 29 textbooks besides contributions of chapters to many other textbooks. In the last 5 years, faculty and students published a total of 502 articles in reputed scientific journals, besides presentations at various national and international conferences, and >400 research projects, >30 of which were funded by external grants. Five members of the faculty have been awarded PhD.

Staff and students of MCODS, Mangalore over the years have been associated with innovation incubators like Philips Base of Pyramid and Manipal Academy Technology Business Incubator. A total of thirty-two innovative equipment and prototypes have been conceptualized and designed by students and members of the faculty of our institute who have also bagged the Manipal Academy of Higher Education Innovation Day awards twice in the last 5 years.

COLLABORATIONS AND PARTNERSHIPS

Student and Staff Exchange Programs are facilitated through our MoU's with foreign universities. Our college has Memoranda of Understanding (MoU) with Queen Mary University, London, University of Hongkong, University of Portsmouth,UK and UITM, Malaysia, University of Turku, University of Tokushima in addition to the university MOU's with universities of Hong Kong, Hiroshima (Japan), Sydney (Australia), Kentucky (USA) ,Perediniya (Srilanka), Karabuk(Turkey), and Griffith university, Australia and UCAM Universidad Catolica Sanantonia De Murcia , Spain, for academic and exchange programmes. Our university has over 200 MoU's with International universities the recent ones are with University of Adelaide, Australia, Euht StPOL, Spain, University of Newcastle, Australia, University of Alabama, USA, and Montan University of Leoben, Austria.

Our institute has signed MOUs with Dental manufacturer companies(Dentsply India,Prevest India etc).Univerisities like St Aloysius Institute of Management and Technology (AIMIT) and Collaborations with NITK Surathkal for research and academic activities.

Our College has endeavored to meet the challenges of global recognition and is recognized by the Malaysian Dental Council, Kathmandu University (Nepal) and Sri Lanka Medical Council.

INTERNSHIP AND EXCHANGE PROGRAMS

The students have a compulsory rotatory internship in the final year of their graduation. MCODS, Mangalore has collaborated for a research project with Boston University, Boston, USA and Royal College of Surgeons. Students from the University of Dundee, Scotland have completed their elective posting at our institution. We are also identified as one of the research centres by Hindustan Unilever Limited (HUL) for clinical trials. Our students have exchange programs wih UiTM Malaysia and University of Tokushima, Japan. We are a nodal training centre to offer programmes by the Korean Orthodontic Research Institute.

COMMUNITY SERVICES

Community outreach programs are regularly conducted in our institution to bring oral health care closer to the underserved populations. A total of five peripheral centres have been adopted by the institution where screening, health education and treatment programs are conducted regularly in a fully equipped mobile dental bus. The institution has a tobacco cessation centre which provides tobacco cessation services and spreads awareness about ill-effects of tobacco use. The institution works in collaboration with national, regional and local organizations in government sector, private sector and Non-Governmental Organizations (NGOs) such as IDA, Red cross to bring oral health closer to the community. The students enjoy doing social services through Direction In Society For Human Awareness (DISHA), a voluntary organization run by the students of the Institute as well as thorough the Voluntary Service Organization (VSO) of the university. The literary unit of the student council publish student magazines, pamphlets for dental health and participate in the road shows for oral health awareness.

CO-CURRICULUAR ACTIVITIES

MCODS, Mangalore has a dedicated students council. The student council organizes the "Dental Week" where the students showcase their literary and co-curricular talents. The students participate in the intercollegiate programme "Utsav" (an intercollegiate cultural programme organized by MAHE), where we were the champions in the year 2016 and 2022, first runners up in 2019,2023 and 2024 from amongst the 21 constituent institutions. Our students have participated in the Swachh Bharat Summer internship and also volunteer as a part of AIESEC; a global non-profit youth run organization. Our College has numerous clubs to encourage and nurture talent. These include the literary club , the drama club ,the dance club and music club to name a few. The Crown jewel of the music club is the college Band 'Silver Creek' which has participated in various inter college events in and around Mangalore.

ALUMNI

MCODS Mangalore is proud to have a thriving and united alumni network. Our alumni, numbering 3631spans across the seven continents and serve as brand ambassadors for our college in the community. We have a unique alumni portal that is web based and serves as a platform to connect, network and grow. Various local alumni chapters across India and abroad meet regularly and a Silver Jubilee Reunion is hosted every year at Mangalore to commemorate the 25th year of every academic batch. Our Alumni also give back to their Alma Mater through mentoring and funding opportunities. It has been two years since Alumni Relations, MCODS Mangalore has launched a pioneering program aimed at connecting students with alumni more meaningfully with the Alumni Student Mentorship Program. Our alumni have tasted success in academia with many of our alumni associated with teaching roles in prominent universities both in India and abroad and some of them donning the mantle of Heads of Departments/Institutions in India and abroad. We are also proud that many have made a mark in private practices in India and abroad with many of alumni having set up high quality treatment centres that are improving the lives of the communities they serve.

PLACEMENT

Our institute has always been very proactive in the success story of PG NEET exams. On an average, annually nearly 50% of our graduates are successful at the All India and State postgraduate entrance examinations and pursue higher education. The progression rate is one of the highest for any dental institute in the country. Many of our graduates have pursued or are pursuing higher education in Canada, USA, Australia, UK and Europe. Besides, hundreds of graduates are successful general dental practitioners in various parts of India and the world.Our institute has tied up with Dental clinic chains like OrthoSquare and Clove dental to recruit our students. Our Alumni entrepreneurs who have started their EduTech Company also recruit our students for their content creation and designing.

UNIQUENESS

- Teacher-Guardian mentoring for all 4 years of BDS.
- Active encouragement and financial support for presentations at conferences by students and faculty.
- Outcome-based education mode of delivery of curriculum.
- Student centred learning.
- Comprehensive 'student life cycle management' system and access to online teaching material created by teaching faculty.
- Holistic development of students and staff: Personality development, gender sensitization programmes, practice management, activities that foster universal values, patriotism and social cohesion etc.

REGULATIONS GOVERNING THE BDS PROGRAMME

DURATION OF THE PROGRAMME:

The duration of undergraduate dental training programme for BDS degree is four years with 240 teaching days in each academic year. In addition to this, the student has to undergo one year of compulsory rotatory internship.

COURSE CURRICULUM:

In the BDS curriculum, subjects are taught in the form of lectures and demonstrations. This course as a whole is an integration of Basic Sciences, Clinical Dentistry and Practical or Laboratory Skills.

The curriculum for First BDS is developed based on outcome based education incorporating a student centric learning approach.

The undergraduate course consists of three main components:

The first component consists of subjects common to Medicine and Dentistry like Anatomy, Physiology and Biochemistry, Pharmacology, Pathology, Microbiology, General Medicine and General Surgery.

The second component runs concurrently with the first and deals with the special aspects of oral and dental tissues, through the subject of Oral Anatomy and Oral Pathology. Finally, the third component is based on the foundations of the first two and deals with the clinical and technical aspects of dentistry as is required for general dental practice.

Students attend dental clinics from third year onwards. In addition to this, students also attend lectures, demonstrations and clinics in General Medicine and General Surgery in Third year. This is mainly to orient them to the role of dentists in general practice.

ATTENDANCE:

1. As per the existing regulations of the Dental Council of India, a student must attend 75% of lectures and 75% of practicals /clinicals to be eligible to appear for the University examination. All leaves including 'MEDICAL LEAVE' is permissible within 25% with medical certificate issued by KMC hospitals only. There is no provision for conducting extra classes/ assignments to make up the attendance shortage.
2. Students who are not permitted to appear for University examination due to shortage of attendance will have to make up the attendance along with succeeding batch by paying the casual fee specified by the University.

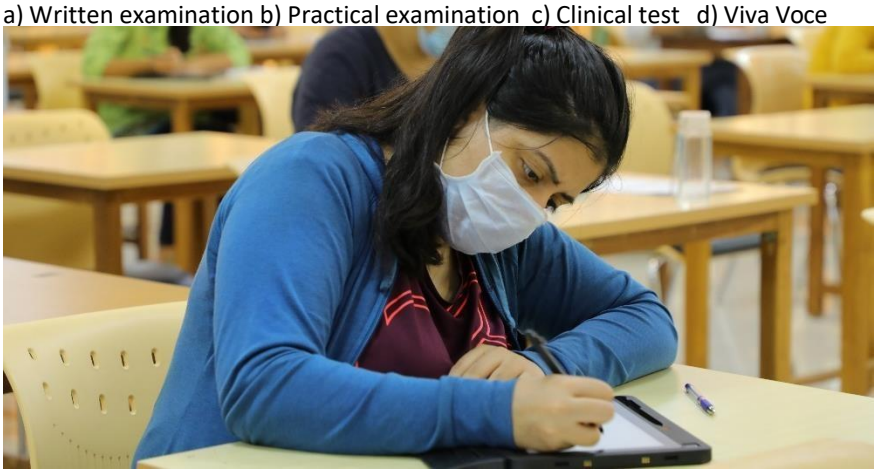
PATTERN OF EXAMINATION:

Evaluation is a continuous process and is achieved by

1. Formative or Internal Assessment
2. Summative or University Examination

Evaluation is carried out by

a) Written examination b) Practical examination c) Clinical test d) Viva Voce



INTERNAL ASSESSMENT:

Three internal assessment examinations will be conducted per academic year.

As a part of the green initiative, the university has introduced the use of e-pads for writing examinations. The students will give their internal assessments and University Examinations on electronic tablets (e-pads) which are comfortable to write and draw. This procedure would save paper and the turn-around time for results would also be faster.

1. Calculation of the Internal assessment marks involves the average of all three sessional examination marks that would form the basis (Theory + viva and practical/clinical examination separately) in that subject. In case a student is not able to attend any of the sessional examinations due to health reasons or any other emergencies, a committee constituted by the Dean will look into the matter (case by case basis). In such a case the average of 2 sessional exams will be taken in accordance with the university rules. There shall be no scope for conducting extra exams.
2. A student must secure a minimum of 30% marks in the Internal Assessment (03 out of 10) in each of the subjects, theory and practical / clinical separately, failing which as per University rules he/she will not be permitted to appear for the University examination in that particular subject(s). To be eligible to appear for the next University examination he/she is required to improve his/her marks by appearing in the sessional examination.

CRITERIA FOR PASS AND CLASSIFICATION OF SUCCESSFUL CANDIDATES:

For declaration of pass in a subject, a candidate is required to secure 50% marks in the University examination both in Theory and Practical/Clinical examinations separately, as stipulated below.

A candidate is required to secure 50% marks in the University theory, Viva

Voce, and Internal assessment combined together. In the University Practical/Clinical examination, a candidate is required to secure 50% of University practical marks and Internal assessment combined together.
In case of Preclinical Prosthetic Dentistry and Preclinical Conservative Dentistry in II BDS, there is no written examination, minimum pass is 50% (Practical and Viva voce combined together in University examination including Internal assessment i.e. 50 out of 100 marks.)
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. A candidate who obtains 75% and above is eligible for Distinction. Only those candidates who have been declared pass in the university examination in the first attempt will be eligible for distinction or class.

UNSUCCESSFUL CANDIDATES:

Students who have failed in the examination can appear for supplementary examination conducted within six months after regular examination. A candidate can only appear twice for the university examination in an academic year. A candidate who fails in only one subject in university examination is permitted to go the next higher class. However, the candidate must appear for the university examination (six months after the regular examination) in that subject and complete it successfully before he/she is permitted to appear for the next higher examination.

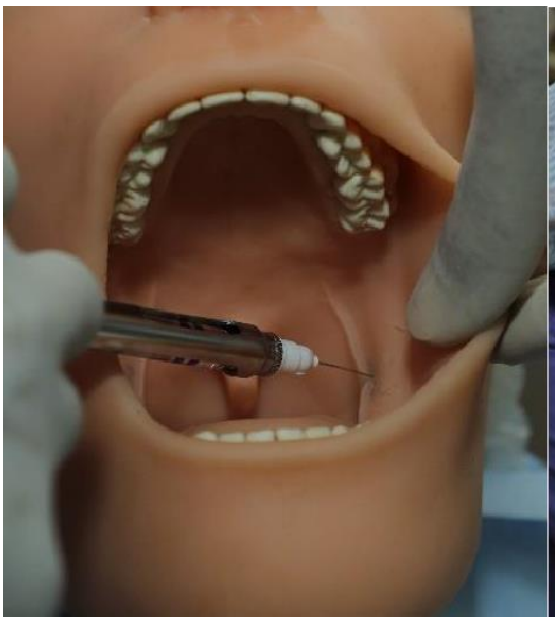
DCI Regulation:
"Any student who does not clear the BDS Course in all the subjects within a period of 9 years, including one year Compulsory Rotatory paid Internship from the date of admission shall be discharged from the course"

GUIDELINES FOR APPEARING FOR THE EXAMINATION:

A student who fails to present himself/herself for examination at the time and place indicated in the published timetable will be deemed to have failed in that part of the examination. Misreading of the time table will not be regarded as a 'sufficient cause'.
Candidates without the possession of Identity card and Hall ticket (Hall ticket is for university exam only) will not be allowed to enter the examination hall.
No candidate will be permitted to enter the examination room after the lapse of half-an-hour from the commencement of examination, and no candidate will be allowed to leave the examination room until after the expiration of half-an-hour from the commencement of the examination. No extra time will be provided for late comers. Malpractice is strictly forbidden and indulgence in any form of the same may result in debarring of the candidate. The candidate will not be permitted to take practical and viva-voce examination till clearance is obtained from an appropriate authority.
In addition, students are expected to strictly abide by the rules and regulations as specified in the hall ticket issued by the University.

IDENTITY CARD / MAHE COMBO CARD

The MAHE Combo card is issued to each student. This card functions as Student identity card, Access control card and Medicare card. Loss of Identity Card should be reported, to the Students Section. You are required to produce the valid Identity card whenever you appear for an examination. Without valid Identity Card no student will be permitted to appear for the examination.



MANIPAL COLLEGE OF DENTAL SCIENCES, MANGALORE - SPATIAL ORIENTATION

CENTRE FOR BASIC SCIENCES, BEJAI

FOURTH FLOOR

- Pre-clinical Dental Anatomy and Histology, Prosthodontics and Dental Material Laboratories

NURSING BLOCK

- Anatomy
- Physiology
- Biochemistry

BASIC SCIENCE BLOCK

- Lecture hall 1 & 2

MCODS, LIGHT HOUSE HILL ROAD (MAIN BUILDING)

GROUND FLOOR

- Reception (MRD)
- Department of Oral Medicine and Radiology
- Department of Oral and Maxillofacial surgery

FIRST FLOOR

- Pro Vice Chancellor's Office
- Deans' Office
- Associate Deans Office
- Administrative Office
- Board Room
- Department of Conservative Dentistry and Endodontics

SECOND FLOOR:

- Department of Orthodontics and Dentofacial Orthopaedics
- Department of Oral Pathology & Microbiology
- Department of Dental Materials
- Implantology
- Pre-Clinical Prosthodontics/ Dental Materials Laboratory

MCODS, LIGHT HOUSE HILL ROAD BUILDING (ANNEXE BUILDING)

GROUND FLOOR

- Department of Prosthodontics and Crown & Bridge (UG)
- Central Laboratory

FIRST FLOOR

- Department of Prosthodontics and Crown & Bridge (PG)

SECOND FLOOR

- Department of Paediatric & Preventive Dentistry (PG)

THIRD FLOOR

- Department of Paediatric & Preventive Dentistry (UG)

FOURTH FLOOR

- Department of Periodontics (PG)

FIFTH FLOOR

- Department of Periodontics (UG)

SIXTH FLOOR

- Department of Public Health Dentistry (UG)

SEVENTH FLOOR

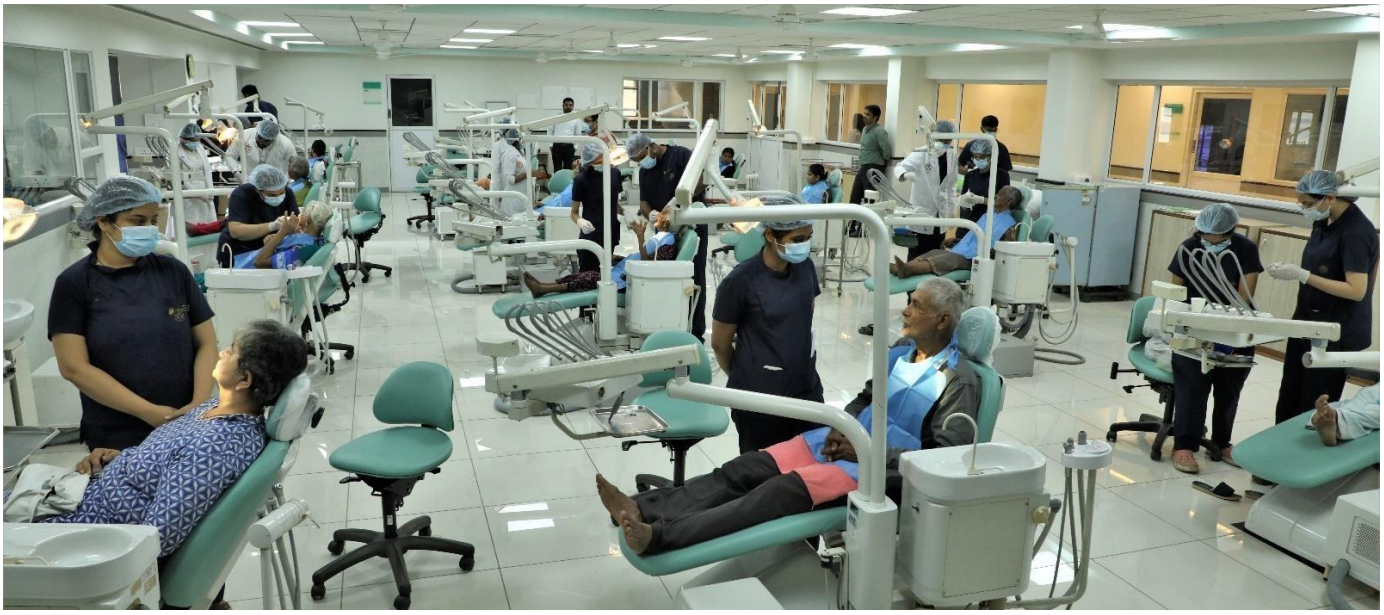
- Department of Public Health Dentistry (PG)
- Preclinical Conservative Laboratory (Phantom head Laboratory)

BASEMENT

- Service Operational Office and Amenities

SUBJECTS OF STUDY

First BDS	
Exam - Going Subjects	Non Exam - Going Subjects
General Anatomy Including Embryology, Osteology & Histology	Dental Materials
General Human Physiology	Pre-clinical Prosthodontics
Biochemistry	
Dental Anatomy, Histology & Embryology	
Second BDS	
Dental Pharmacology & Therapeutics	Oral Pathology & Microbiology
General Pathology	Pre-Clinical Orthodontics
Microbiology	
Dental Materials	
Pre-clinical Prosthodontics	
Pre-clinical Conservative Dentistry	
Third BDS	
General Medicine	Oral Medicine & Radiology
General Surgery	Oral & Maxillofacial Surgery
Oral Pathology & Microbiology	Conservative Dentistry & Endodontics
	Periodontology
	Pediatric & Preventive Dentistry
	Orthodontics & Dentofacial Orthopedics
	Prosthodontics & Crown & Bridge
	Public Health Dentistry
Final BDS Part I	
Oral Medicine & Radiology	Conservative Dentistry & Endodontics
Periodontology	Prosthodontics & Crown & Bridge
Orthodontics & Dentofacial Orthopedics	
Public Health Dentistry	Oral & Maxillofacial Surgery
Final Year Part II	
Pediatric and Preventive Dentistry	
Conservative Dentistry & Endodontics	
Prosthodontics & Crown & Bridge	
Oral & Maxillofacial Surgery	



DISTRIBUTION OF MARKS FOR EXAM - GOING SUBJECTS:

Subject	Theory					Practical / Clinics			
	MCQ	Descriptive	Viva voce	Internal Assessment	Total	University	Internal Assessment	Total	Grand Total
First Year BDS									
Anatomy	10	60	20	10	100	90	10	100	**200**
Physiology	5	30	10	5	50	45	5	100	**200**
Biochemistry	5	30	10	5	50	45	5		
Dental Anatomy & Oral Histology	10	60	20	10	100	90	10	100	**200**
Second Year BDS									
Pharmacology	10	60	20	10	100	90	10	100	**200**
Pathology	5	30	10	5	50	45	5	100	**200**
Microbiology	5	30	10	5	50	45	5		
Dental Materials	10	60	20	10	-	90	10	100	**200**
Pre-Clinical Prosthodontics	-	-	-	-	-	80*	20	100	**100**
Pre-Clinical Conservative	-	-	-	-	-	80*	20	100	**100**
Third Year BDS									
General Medicine	10	60	20	10	100	90	10	100	**200**
General Surgery	10	60	20	10	100	90	10	100	**200**
Oral Pathology and Oral Microbiology	10	60	20	10	100	90	10	100	**200**
Final Year BDS - Part I									
Public Health Dentistry	10	60	20	10	100	90	10	100	**200**
Periodontology	10	60	20	10	100	90	10	100	**200**
Orthodontics & Dentofacial Orthopedics	10	60	20	10	100	90	10	100	**200**
Oral Medicine and Radiology	10	60	20	10	100	90	10	100	**200**
Final Year BDS - Part II									
Prosthodontics and Crown & Bridge	10	60	20	10	100	90	10	100	**200**
Conservative Dentistry and Endodontics	10	60	20	10	100	90	10	100	**200**
Oral and Maxillofacial Surgery	10	60	20	10	100	90	10	100	**200**
Pediatric and Preventive Dentistry	**10**	**60**	**20**	**10**	**100**	**90**	**10**	**100**	**200**

**60 marks for Practical work and 20 marks for Viva-voce*

***No negative marking for MCQ*

ACADEMIC CALENDAR OF FIRST YEAR BDS 2024-2025*

Activity	Duration
Block 1 - Working days:81 days	01-10-2024 to 12-01-2025
Commencement of the course	01-10-2024
First sessional examination	03,04,06 January 2025
First Sessional practical examination	08,09,10,11 January 2025
Block II - Working days:79 days	13-01-2025 to 01-02-2025 and 17-02-2025 to 06-05-2025
Commencement of the Second term	13-01-2025
Mid-term vacation	02-02-2025 to 16-02-2025
Continuation of the Second term	17-02-2025 to 06-05-2025
Second sessional examination	26,28,29 April 2025
II Sessional practical examination	02,03,05,06 May 2025
Block III - Working days:80 days	07-05-2025 to 11-08-2025
Commencement of the third term	07-05-2025
Third sessional examination	25,26,28 July 2025
Third Sessional practical examination	30,31 July and 01,02 August 2025
Last date for submission of internal assessment	11-08-2025
Last working day of the year	11-08-2025
University Examination	
University theory examination	26,28,30 August 2025
University practical examination	01,02,03,04,05 September 2025
Annual vacation	06-09-2025 to 21-09-2025
Commencement of the next academic year	22-09-2025
Available working days from 01-10-2024 to 11-08-2025	About 240 days
	I Term : 14 weeks : 81 days
	II Term: 13 weeks: 79 days
	III Term: 13 weeks: 80 days

* *Subject to change.*

TIME-TABLE FOR FIRST BDS

Days	9 am to 11 am	11 am - 12 Noon	12pm-1pm	2.30 pm- 5 pm	
Monday	DA/DH Practical (Batch A) Physiology Practical (Batch B)	DA/DH Lecture L. H. 2	Biochemistry Lecture L. H. 2	DA/DH Practical(Batch B)	
Tuesday	DA/DH Practical (Batch B) Physiology Practical (Batch A)	Dental Materials Lecture L. H. 2	DA/DH Lecture L. H. 2	DA/DH Practical(Batch A)	
Wednesday	Prosthodontics Practical (Batch A) Biochemistry Practical (Batch B)	Anatomy Lecture L. H. 2	Physiology Lecture L. H. 2	Dental Materials Lecture L.H.2 (2.30-3.30 pm)	DA/DH Lecture L.H.2 (3.30-4.30 pm)
Thursday	Anatomy Dissection	Physiology Lecture(Demo Room)	Anatomy Lecture L.H.2	Physiology Lecture L. H. 2 (2.30 - 3.30 pm)	Biochemistry Lecture L. H. 2 (3.30 - 4.30 pm)
Friday	Anatomy Dissection	Biochemistry Lecture(Demo Room)	Anatomy Lecture (Demo Room)	DA/DH Practical	
Saturday	Prosthodontics Practical (Batch B) Biochemistry Practical (Batch A)	First term: Dental Materials Practical Second term: Prosthodontics Practical		Physiology Lecture L.H.2 (2.30 - 3.30 pm)	Teacher-Guardian Meeting/ Student Activity (3.30-4.30 pm)

Note: The venue of the practical classes will be at their respective departments. Theory venues are mentioned in the time table.

CURRICULUM

Manipal College of Dental Sciences, Mangalore has implemented Outcome Based Education system of curriculum delivery for 2020-21 batch. The syllabus for the first year subjects are provided in this document. Each of the statements are associated with a level of competency in both the cognitive (knowledge) and the psychomotor (practical) domains. The levels are designated based on the Blooms Taxonomy as follows.

COGNITIVE DOMAIN

C1 – Knowledge

- Recall/remember previously learnt information

C2 – Comprehension

- Explain learnt information

C3 – Application

- Use learnt information in another familiar or new situation

C4 – Analysis

- Break information into parts to explore understandings and relationships

C5 – Synthesis

- Put together parts of learnt information to form new whole

C6 – Evaluation

- Judge the value of a decision or course of action

PSYCHOMOTOR DOMAIN

P1 – Perception

- The ability to use sensory cues to guide motor activity

P2 – Set

- The readiness to act

P3 – Guided response

- Observe and imitate action or activity

P4 – Mechanism

- Perform activity or tasks from written or verbal instruction

P5 – Complex overt response

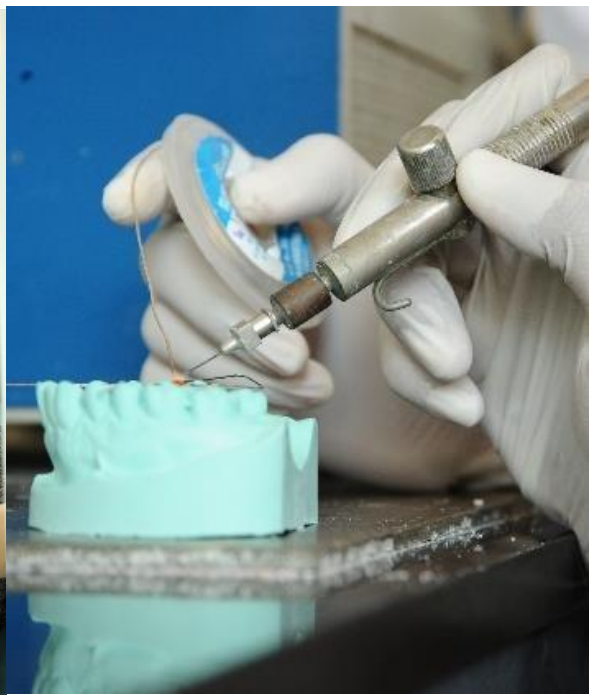
- Perform activity or tasks independently

P6 - Adaptation

- Coordinate and modify activity or tasks to address new situations

P7 – Origination

- Create and execute a new technique or task



HUMAN ANATOMY INCLUDING EMBRYOLOGY, HISTOLOGY & MEDICAL GENETICS

COURSE OUTCOMES (COS):

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

CO 1: Describe the gross anatomy of structures in the human body with special emphasis on head and neck region and understand the anatomical basis of disease and injury to the structures as applicable to a dental practitioner. (C2, P2)

CO 2: Describe the microscopic structure of tissues, a pre- requisite for understanding the disease process as applicable to a dental practitioner (C1, P1)

CO 3: Describe the normal development, critical stages of development of embryo and effects of abnormal development, teratogenicity, genetic mutations, environmental hazards affecting the head and neck region as applicable to a dental practitioner (C1, P1)

CO 4: Apply the knowledge and skills gained in anatomy course, while interpreting pictures of imaging techniques, performing procedures and grow to be an ethical dental professional (C2, P2)

UNIT 1: GROSS ANATOMY INCLUDING HISTOLOGY & EMBRYOLOGY

Orientation & Introduction to Anatomy

- Describe the subdivisions of anatomy (C1)
- Describe the anatomical terms and planes (C1)
- Describe the connective tissue, skin, superficial and deep fasciae (C1)

Introduction to cardiovascular system & lymphatic system

- Define systemic, pulmonary & portal circulations (C1)
- Name the types of arteries and veins (C1)
- Describe the subdivisions of arteries and veins (C1)
- Describe lymphatic system and its subdivisions (C1)

Introduction to Skeletal system

- Define cartilage and bone with its components (C1)
- Name the types of cartilages and bones with examples (C1)
- Describe the bone growth & types of ossification of bones (C1)
- Describe the parts of a developing long bone (C1)
- Name the types of epiphyses with examples for each (C1)

Introduction to muscles

- Name the types of muscles with examples (C1)
- Describe the innervation of skeletal muscles (C1)
- Describe the parts of skeletal muscles-tendons & aponeurosis (C1)
- Describe the structure of skeletal muscles (C1)

Introduction to Joints

- Name the classes (types and subtypes) of joints (C1)
- Give examples for each type and subtype (C2)
- Describe the structure of a typical synovial joint (C1)

Introduction to Nervous system

- Describe the Nervous tissue, neurons and neuroglial cells (C1)
- Name the types of neurons (C1)
- Give examples for each type (C2)
- Describe the process of myelination (C1)
- Name the subdivisions of nervous system (C1)
- Describe the formation of a typical spinal nerve (C1)

Scalp

- Describe the layers of scalp (C1)
- Describe the blood supply, nerve supply and lymphatic drainage of scalp (C1)
- Explain the applied anatomy of scalp (C2)

Muscles of facial expression

- Names the muscles of facial expression (C1)
- Describe the nerve supply & actions of muscles of facial expression (C1)
- Describe the attachments, nerve supply and actions of orbicularis oculi, orbicularis oris and buccinators, platysma (C1)

Blood supply and nerve supply of face Eyelids and lacrimal apparatus

- Describe the arteries and veins of the face (C1)
- Describe the nerve supply to the face (C1)
- Describe the origin, course, termination, tributaries, connections of facial vein (C1)
- Explain the applied anatomy of facial vein (C2)
- Describe the origin, course, termination and tributaries of retromandibular vein (C1)
- Describe the structure of eyelids (C1)
- Name the components of lacrimal apparatus (C1)
- Describe the lacrimal gland with its nerve supply & blood supply (C1)

Deep fascia of neck

- Describe the layers, attachments and applied aspects of deep fascia of the neck (C1)

Posterior triangle of neck

- Sternocleidomastoid
- Describe the boundaries, subdivisions and contents of posterior triangle of neck (C1)
- Describe the boundaries and contents of occipital triangle (C1)
- Describe the boundaries and contents of subclavian triangle (C1)

- Describe the formation and branches of brachial plexus (C1)
- Explain the applied anatomy of supraclavicular part of brachial plexus (C2)
- Describe the origin, course, termination, major relations, tributaries of external jugular vein (C1)
- Explain the applied anatomy of external jugular vein (C2)
- Describe the attachments, nerve supply and actions of sternocleidomastoid (C1)
- Explain the applied anatomy of sternocleidomastoid (C2)

Suboccipital triangle

- Describe the boundaries, contents & clinical anatomy of suboccipital triangle (C1)

Anterior triangle of neck

- Describe the boundaries and subdivisions of anterior triangle (C1)
- Describe the boundaries and contents of carotid triangle (C1)
- Describe the boundaries and contents of digastric triangle
- Describe the boundaries and contents of muscular triangle (C1)
- Describe the boundaries and contents of submental triangle (C1)
- Describe the mid line structures of neck (C1)
- Describe the origin, course, major relations, termination & branches of common carotid artery (C1)
- Describe the origin, course, termination, major relations & branches of external carotid artery (C1)
- Describe the origin, course, termination, major relations & branches of facial & lingual arteries (C1)
- Describe the origin, course, termination, major relations & tributaries of internal jugular vein (C1)

Deep Structures of Neck

- Name the parts of thyroid gland (C1)
- Describe the location, capsules, features & relations, blood supply, nerve supply and lymphatic drainage of thyroid gland (C1)
- Explain the applied anatomy of thyroid gland (C2)
- Describe the location, blood supply, lymphatic drainage of parathyroid gland (C1)
- Explain the applied anatomy of parathyroid gland (C2)
- Describe the origin, course, relations, distribution of hypoglossal nerve, cervical sympathetic chain (C1)
- Explain the applied anatomy of hypoglossal nerve, cervical sympathetic chain (C2)
- Describe the origin, course, relations, distribution of glossopharyngeal, accessory and vagus nerve (C1)
- Explain the applied anatomy of hypoglossal nerve, cervical sympathetic chain (C2)
- Name the parts of subclavian artery (C1)
- Describe the origin, course, major relations, termination & branches of subclavian artery (C1)
- Name the parts of vertebral artery (C1)
- Name the parts of internal carotid artery (C1)
- Describe the extent, relations, blood supply, nerve supply & lymphatic drainage of trachea & cervical part of esophagus (C1, P1)

Histology

- Describe the types, structure, function & distribution of basic tissues (C1)
- Name the types of epithelia (C1)
- Describe the types, structure, function & distribution of epithelial tissue (C1)
- Describe the components of connective tissue (C1)
- Describe the different types of connective tissue fibers & cells with their functions (C1)
- Name the types of cartilages (C1)
- Describe the types, structure, function and distribution of cartilages (C1)
- Describe the structure & function of bone (C1)
- Name the types of muscular tissue (C1)
- Describe the differences between skeletal, cardiac and smooth muscles (C1)
- Describe the microscopic structure of neurons & nerve fibers (C1)
- Describe the microscopic structure of spinal & sympathetic ganglia, & optic nerve (C1)
- Classify the blood vessels (C1)
- Describe the microscopic structure different types of blood vessels (C1)

Embryology

- Introduction -Parts of Male & Female reproductive organs
- Describe gametogenesis (C1)
- Describe spermatogenesis (C1)
- Describe oogenesis (C1)
- Describe the ovarian cycle & uterine cycle (C1)
- Describe the formation, function & fate of Graafian follicle (C1)
- Describe the formation, function and fate of corpus luteum (C1)
- Describe fertilization (C1)
- Describe Cleavage (C1)
- Describe formation of blastocyst (C1)
- Describe the bilaminar and trilaminar germ discs (C1)
- Describe the formation, function and fate of trophoblast (C1)
- Describe the formation, function and fate of prochordal plate and primitive streak (C1)
- Describe the formation, function and fate of notochord (C1)
- Describe the formation, function and fate of amniotic cavity, chorion (C1)
- Describe the extraembryonic mesoderm & coelom (C1)

- Describe the formation, subdivisions and fate of intraembryonic mesoderm (C1)
- Describe the formation and fate of somites (C1)
- Describe the formation and fate of neural tube (C1)
- Describe the formation and derivatives neural crest (C1)
- Describe the Folding of embryo (C1)
- Describe the development, structure & functions of placenta (C1)

UNIT 2: GROSS ANATOMY INCLUDING HISTOLOGY, EMBRYOLOGY & GENETICS

Cranial cavity

- Describe the dural folds, dural venous sinuses, blood vessels & nerves of cranial cavity (C1)
- Explain the applied anatomy of dural venous sinuses (C2)
- Describe the site, size, parts, relations, blood supply, development & applied anatomy of pituitary gland (C1)
- Describe the origin, course, branches, distribution of middle meningeal artery & trigeminal ganglion (C1)
- Explain its applied aspects (C2)

Orbit

- Describe the boundaries of orbital cavity (C1)
- Name the contents of the orbital cavity (C1)
- Describe the attachments, nerve supply, actions of muscles of the orbit (C1)
- Explain the applied anatomy of muscles of the orbit (C2)
- Describe the origin, course, distribution of ophthalmic, oculomotor, abducent, trochlear & optic nerves (C1)
- Explain the applied anatomy of ophthalmic, oculomotor, abducent, trochlear & optic nerves (C2)
- Describe the site, connections & branches of ciliary ganglion (C1)
- Describe the origin, course & branches of ophthalmic artery (C1)
- Describe the origin, course & termination of ophthalmic veins (C1)

Parotid region

- Describe the location, coverings, surfaces, borders, relations, nerve supply, blood supply, lymphatic drainage of the parotid gland (C1)
- Describe the structures within the parotid gland (C1)
- Describe the parotid duct (C1)
- Explain the applied anatomy of the parotid gland & duct (C2)

Facial nerve

- Describe the origin, course, termination, relations, branches and distribution of facial nerve (C1)
- Explain the applied anatomy of facial nerve (C2)

Infratemporal fossa

- Describe the boundaries of temporal & infratemporal fossae (C1)
- Name the contents of temporal & infratemporal fossae (C1)
- Name the muscles of mastication (C1)
- Describe the attachments, nerve supply & actions of muscles of mastication (C1)
- Explain the applied anatomy of muscles of mastication (C2)
- Describe the origin, course, termination, relations, branches and distribution of mandibular nerve (C1)
- Explain the applied anatomy of mandibular nerve (C2)
- Describe the location, relations, connections, branches and functions of otic ganglion
- Describe the origin, course, termination, parts & branches of maxillary artery (C1)

Pterygopalatine fossa

- Describe the boundaries of pterygopalatine fossa (C1)
- Describe the origin, course, termination, relations, branches and distribution of maxillary nerve (C1)
- Explain the applied anatomy of maxillary nerve (C2)
- Describe the location, relations, connections, branches and functions of pterygopalatine ganglion

Temporomandibular joint

- Name the type and subtype of temporomandibular joint (C1)
- Describe the articular surfaces, ligaments, relations, nerve supply, blood supply, movements, and muscles producing each movement of temporomandibular joint (C1)
- Explain the applied anatomy of temporomandibular joint (C2)

Submandibular region

- Describe the location, coverings, parts, surfaces, relations, blood supply, nerve supply, lymphatic drainage of the submandibular gland (C1)
- Describe the origin course and termination of submandibular duct (C1)
- Explain the applied anatomy of the submandibular gland (C2)
- Describe the attachments, relations, nerve supply & actions of hyoglossus muscle (C1)
- Describe the location, relations, connections, functions and branches of submandibular ganglion (C1)
- Describe the attachments, relations, nerve supply & actions of mylohyoid muscle (C1)
- Identify digastric muscles (C1, P1)
- Describe the attachments, nerve supply, actions of digastric muscles (C1, P1)
- Explain the applied anatomy of digastric muscles (C2, P2)

Embryology

- Describe the pharyngeal arches, pouches & clefts (C1)
- List the derivatives of pharyngeal arches, pouches & clefts (C1)
- Describe the development of tongue, palate, thyroid gland, tooth & salivary glands (C1)
- Describe the development of face & palate (C1)
- List the anomalies of face, & palate (C1)

Histology

- List the lymphatic organs (C1)
- Describe the microscopic structure and function of lymph node, tonsil, thymus and spleen (C1)
- List the different types of salivary glands (C1)
- Describe the microscopic structure of each types of salivary glands (C1)
- Name the endocrine glands (C1)
- Describe the thyroid gland, parathyroid glands, pituitary & adrenal gland (C1)
- Describe the microscopic structure of lip, epiglottis, trachea and lung (C1)

Genetics

- Describe the basics of medical genetics (C1)

- Describe the chromosomes (C1)
- Describe the structural & numerical aberrations of chromosomes (C1)
- Describe the applied aspects/clinical manifestations of syndromes (C1)

UNIT 3: GROSS ANATOMY INCLUDING HISTOLOGY, EMBRYOLOGY & RADIOLOGY

Pharynx

- Name the parts of pharynx (C1)
- Describe the extent and internal features of each part of pharynx (C1)
- Describe the structure of wall of the pharynx (C1)
- Name the muscles of pharynx (C1)
- Describe the attachments, nerve supply and actions of muscles of pharynx (C1)
- Explain the applied anatomy of pharynx (C2)
- Describe the location, relations, blood supply, nerve supply of palatine tonsil (C1)
- Explain the applied anatomy of palatine tonsil (C2)
- Describe the auditory tube (C1)
- Explain the applied anatomy of soft palate & auditory tube (C2)

Palate & auditory tube

- Describe the hard palate (C1)
- Describe the soft palate (C1)
- Describe the auditory tube (C1)

Nasal cavity and paranasal air sinuses

- Describe the boundaries of nasal cavity (C1)
- Describe the features in each wall of the nasal cavity (C1)
- Describe the nerve supply & blood supply of the nasal cavity (C1)
- Explain the applied anatomy of the nasal cavity (C2)
- Name and describe the paranasal air sinuses (C1)
- Explain the applied anatomy of the paranasal air sinuses (C2)

Oral cavity and Tongue

- Name the parts of the oral cavity (C1)
- Name the parts of the tongue (C1)
- Describe the surfaces, features, blood supply, nerve supply, lymphatic drainage of the tongue (C1)
- Names the muscles of tongue (C1)
- Describe the attachments, nerve supply & actions of muscles of tongue (C1)
- Explain the applied anatomy of the tongue (C2)

Larynx

- Name the cartilages of larynx (C1)
- Describe the major features of cartilages of larynx (C1)
- Name the ligaments / membranes of larynx (C1)
- Describe the attachments of ligaments / membranes of larynx (C1)
- Name the joints of larynx (C1)
- Name the intrinsic muscles of larynx (C1)
- Describe the attachments, nerve supply & actions of muscles of larynx (C1)
- Name the extrinsic muscles of larynx (C1)
- Describe the actions of extrinsic muscles of larynx (C1)
- Describe the parts, features, epithelial lining of interior of larynx (C1)
- Describe the nerve supply, blood supply & lymphatic drainage of larynx (C1)
- Explain the applied anatomy of larynx (C2)

Lymphatic drainage of Head And Neck

- Name and describe the lymph nodes related to head and neck region (C1)

Environmental science

- Describe the method of disposal of dissected cadaver, organs and tissues (C1)
- Describe the method of disposal of chemicals used in preservation (C1)

Histology

- Describe the microscopic structure of tooth and tongue (C1)
- Name the parts of small intestine (C1)
- Describe the microscopic structure of Duodenum & Ileum (C1)
- Name the parts of Large intestine (C1)
- Describe the microscopic structure of Large intestine & appendix (C1)
- Describe the microscopic structure of liver & pancreas (C1)
- Name the parts of urinary system (C1)
- Describe the microscopic structure of kidney, ureter & urinary bladder (C1)
- Name the parts of male and female reproductive system (C1)
- Describe the microscopic structure of ovary & testis (C1)

UNIT 4 – PRACTICAL

Introduction & general anatomy

- Describe the anatomical terms, planes and subdivisions (C1, P1)
- Discuss the general anatomy of connective tissue, blood vessels, muscles, nerves, bones, joints and lymphatics (C1, P1)

Scalp

- Identify the structures in the scalp (C1, P1)
- Describe the structures in the scalp (C1, P1)
- Explain the applied anatomy of the scalp (C2, P2)
- Identify the features of the norma verticalis of the skull (C1, P1)
- Describe the features of the norma verticalis of the skull (C1, P1)

Face

- Identify the structures & muscles in the face (C1, P1)
- Describe the muscles in the face (C1, P1)
- Explain the applied anatomy of the face (C2, P2)
- Identify and Describe the arteries and veins of the face (C1)
- Describe the nerve supply to the face (C1)

- Describe the origin, course, termination, tributaries, connections of facial vein (C1)
- Explain the applied anatomy of facial vein (C2)
- Describe the origin, course, termination and tributaries of retromandibular vein (C1)
- Identify the components of lacrimal apparatus (C1, P1)
- Describe the components of lacrimal apparatus (C1, P1)
- Explain the applied anatomy of the lacrimal apparatus (C2, P2)
- Identify the features of the norma frontalis of the skull (C1, P1)

Posterior triangle of neck

- Identify the boundaries and contents of each of the subdivisions of posterior triangle (C1, P1)
- Describe the boundaries and contents of each of the subdivisions of posterior triangle (C1, P1)
- Explain the applied anatomy of the posterior triangle and its subdivisions (C2, P2)
- Identify the branches of supraclavicular part of brachial plexus (C1, P1)
- Describe the formation and branches of brachial plexus (C1, P1)
- Explain the applied anatomy of supraclavicular part of brachial plexus (C2, P2)
- Identify sternocleidomastoid muscles (C1, P1)
- Describe the attachments, nerve supply, actions of sternocleidomastoid (C1, P1)
- Explain the applied anatomy of sternocleidomastoid (C2, P2)
- Suboccipital triangle
- Identify the boundaries and contents of suboccipital triangle (C1, P1)
- Describe the boundaries and contents of suboccipital triangle (C1, P1)
- Explain the clinical anatomy of suboccipital triangle (C2, P2)
- Identify the features of the norma occipitalis of the skull (C1, P1)
- Describe the features of the norma occipitalis of the skull (C1, P1)

Anterior triangle of neck

- Identify the boundaries and contents of each of the subdivisions of anterior triangle (C1, P1)
- Describe the boundaries and contents of each of the subdivisions of anterior triangle (C1, P1)
- Explain the applied anatomy of the anterior triangle and its subdivisions (C2, P2)
- Identify the midline structures of the neck (C1, P1)
- Describe the midline structures of the neck (C1, P1)

Deep dissection of neck

- Identify the thyroid and parathyroid glands (C1, P1)
- Describe the features, relations and blood supply of thyroid and parathyroid glands (C1, P1)
- Identify trachea, oseophagus, subclavian artery, Brachiocephalic veins, cranial nerves 9, 10,11,12, cervical part of sympathetic trunk (C1, P1)
- Describe the extent, relations, blood supply, nerve supply & lymphatic drainage of trachea & cervical part of esophagus (C1, P1)

Cranial cavity

- Identify the features of the cranial cavity (C1, P1)
- Describe the features of the cranial cavity (C1, P1)
- Identify the dural folds, dural venous sinuses, blood vessels & nerves of cranial cavity (C1, P1)
- Describe the dural folds, dural venous sinuses, blood vessels & nerves of cranial cavity (C1, P1)
- Explain the applied anatomy of dural venous sinuses (C2, P2)
- Identify the pituitary gland (C1, P1)
- Describe the location, size, parts, relations, blood supply & development of pituitary gland (C1, P1)
- Identify the middle meningeal artery (C1, P1)
- Describe the origin, course, relations, and branches middle meningeal artery (C1, P1)
- Identify the trigeminal ganglion (C1, P1)

Orbit

- Identify the boundaries of orbital cavity (C1, P1)
- Describe the boundaries of orbital cavity (C1, P1)
- Identify the contents of the orbital cavity (C1, P1)
- Describe the attachments, nerve supply, actions of muscles of the orbit (C1, P1)
- Explain the applied anatomy of muscles of the orbit (C2, P2)
- Describe the origin, course, distribution of ophthalmic, oculomotor, abducent, trochlear & optic nerves (C1, P1)
- Explain the applied anatomy of ophthalmic, oculomotor, abducent, trochlear & optic nerves (C2, P2)
- Describe the site, connections & branches of ciliary ganglion (C1, P1)
- Describe the origin, course & branches of ophthalmic artery (C1, P1)
- Describe the origin, course & termination of ophthalmic veins (C1, P1)

Parotid region

Facial nerve

- Identify the surfaces, borders and relations of parotid gland (C1, P1)
- Describe the location, coverings, surfaces, borders, relations, nerve supply, blood supply, lymphatic drainage of the parotid gland (C1, P1)
- Identify the intraparotid structures (C1, P1)
- Describe the intraparotid structures and parotid duct (C1, P1)
- Explain the applied anatomy of the parotid gland (C2, P2)
- Identify the facial nerve and its branches in the face (C1, P1)
- Describe the location, relation and branches of facial nerve in the face (C1, P1)
- Explain the applied anatomy of the facial nerve (C2, P2)

Infratemporal fossa

- Identify the boundaries & contents of temporal & infratemporal fossae (C1, P1)
- Describe the boundaries & contents of temporal & infratemporal fossae (C1, P1)
- Identify the muscles of mastication (C1, P1)
- Describe the attachments, nerve supply & actions of muscles of mastication (C1, P1)
- Explain the applied anatomy of muscles of mastication (C2, P2)
- Describe the origin, course, termination, relations, branches and distribution of mandibular nerve (C1, P1)
- Explain the applied anatomy of mandibular nerve (C2, P2)

- Describe the location, relations, connections, branches and functions of otic ganglion (C1, P1)
- Describe the origin, course, termination, parts & branches of maxillary artery (C1, P1)
- Identify the features of the norma lateralis (C1, P1)
- Describe the features of the norma lateralis (C1, P1)
- Identify the features of the norma basalis (C1,P1)

Pterygopalatine fossa

- Identify the boundaries & contents of pterygopalatine fossa (C1)
- Describe the origin, course, termination, relations, branches and distribution of maxillary nerve (C1)
- Explain the applied anatomy of maxillary nerve (C2)
- Describe the location, relations, connections, branches and functions of pterygopalatine ganglion (C1)

Temporomandibular joint

- Identify the parts of temporomandibular joint (C1, P1)
- Name the type and subtype of temporomandibular joint (C1, P1)
- Describe the articular surfaces, ligaments, relations, nerve supply, blood supply, movements, and muscles producing each movement of temporomandibular joint (C1, P1)
- Explain the applied anatomy of temporomandibular joint (C2, P2)

Submandibular region

- Identify the structures in the submandibular region (C1, P1)
- Identify the parts of submandibular gland (C1, P1)
- Describe the location, coverings, parts, surfaces, relations, blood supply, nerve supply, lymphatic drainage of the submandibular gland (C1, P1)
- Describe the origin, course and termination of submandibular duct (C1, P1)
- Explain the applied anatomy of the submandibular gland (C2, P2)
- Describe the attachments, relations, nerve supply & actions of hyoglossus muscle (C1, P1)
- Describe the location, relations, connections, functions and branches of submandibular ganglion (C1, P1)
- Describe the attachments, relations, nerve supply & actions of mylohyoid muscle (C1, P1)
- Identify the features of the mandible (C1, P1)
- Describe the features of the mandible (C1, P1)
- Describe the attachments, nerve supply and actions of digastric muscles (C1)
- Explain the applied anatomy of digastric muscles (C2)

Oral cavity

- Identify the parts of oral cavity (C1, P1)
- Identify the parts and papillae of the tongue (C1, P1)
- Describe the surfaces, features, blood supply, nerve supply and lymphatic drainage of tongue (C1, P1)
- Identify the muscles of tongue (C1, P1)
- Describe the attachments, nerve supply & actions of muscles of tongue (C1, P1)
- Explain the applied anatomy of the tongue (C2, P2)
- Identify the hyoid bone (C1, P1)
- Describe the features and attachments of hyoid bone (C1, P1)

Palate

- Identify the hard palate (C1, P1)
- Describe the hard palate (C1, P1)
- Identify the soft palate (C1, P1)
- Describe the soft palate (C1, P1)
- Explain the applied anatomy of soft palate (C2, P2)

Nasal cavity and paranasal sinuses

- Identify the boundaries of the nasal cavity (C1, P1)
- Identify the features on the walls of the nasal cavity (C1, P1)
- Describe the walls of the nasal cavity (C1, P1)
- Explain the applied anatomy of the nasal cavity (C2, P2)
- Identify the paranasal air sinuses (C1, P1)
- Describe the paranasal air sinuses (C1, P1)
- Explain the applied anatomy of the paranasal air sinuses (C2, P2)

Pharynx

- Identify the parts and features of the pharynx (C1, P1)
- Describe the extent and features of parts of pharynx (C1, P1)
- Describe the structure of wall of the pharynx (C1, P1)
- Identify the muscles of pharynx (C1, P1)
- Describe the attachments, nerve supply and actions of muscles of pharynx (C1, P1)
- Explain the applied anatomy of pharynx (C1, P1)
- Identify the palatine tonsil (C1, P1)
- Describe the location, relations, blood supply, nerve supply of palatine tonsil (C1, P1)
- Explain the applied anatomy of palatine tonsil (C2, P2)
- Describe the auditory tube (C1, P1)
- Explain the applied anatomy of soft palate & auditory tube (C2, P2)

Larynx

- Identify the cartilages of larynx (C1, P1)
- Describe the major features of cartilages of larynx (C1, P1)
- Identify the ligaments / membranes of larynx (C1, P1)
- Describe the attachments of ligaments / membranes of larynx (C1, P1)
- Identify the intrinsic muscles of larynx (C1, P1)
- Describe the attachments, nerve supply & actions of intrinsic muscles of larynx (C1, P1)
- Identify the extrinsic muscles of larynx (C1, P1)
- Describe the actions of extrinsic muscles of larynx (C1, P1)
- Identify the parts and features of larynx (C1, P1)
- Describe the features and epithelial lining of interior of larynx (C1, P1)
- Describe the nerve supply, blood supply & lymphatic drainage of larynx (C1, P1)
- Explain the applied anatomy of larynx (C2, P2)

Histology

- Identify the parts of compound microscope (C1, P1)
- Describe the features & function of compound microscope (C1, P1)
- Describe the types, structure, function & distribution of basic tissues (C1, P1)
- Identify different types of epithelia (C1, P1)
- Discuss the types, structure, function & distribution of epithelial tissue (C1, P1)
- Identify the components of connective tissue (C1, P1)
- Discuss the types and components of connective tissue (C1, P1)
- Identify different types of connective tissue fibers & cells (C1, P1)

- Discuss the different types of connective tissue fibers & cells with their functions (C1, P1)
- Identify different types of cartilages (C1, P1)
- Discuss the types, structure, function & distribution of cartilages (C1, P1)
- Identify the longitudinal and transverse sections of compact bones (C1, P1)
- Discuss the structure & function of compact bones (C1, P1)
- Identify the different types of muscular tissue (C1, P1)
- Discuss the structure of different types of muscle tissue (C1, P1)
- Identify the differences between skeletal, cardiac and smooth muscles (C1, P1)
- Discuss the differences between skeletal, cardiac and smooth muscles (C1, P1)
- Identify the neurons, nerve fibers & neuroglia (C1, P1)
- Discuss the microscopic structure of neurons & nerve fibers (C1, P1)
- Identify the spinal & sympathetic ganglia, & optic nerve (C1, P1)
- Discuss the microscopic structure of spinal & sympathetic ganglia, & optic nerve (C1, P1)
- Identify the lymph node, tonsil, thymus and spleen (C1, P1)
- Discuss the microscopic structure of lymph node, tonsil, thymus and spleen (C1, P1)
- Identify different types of salivary glands (C1, P1)
- Discuss the microscopic structure of each type of salivary glands (C1, P1)
- Identify the thyroid & parathyroid glands (C1, P1)
- Discuss the microscopic structure of thyroid & parathyroid glands (C1, P1)
- Identify the pituitary & adrenal gland (C1, P1)
- Discuss the microscopic structure of pituitary & adrenal gland (C1, P1)
- Identify the lip, epiglottis, trachea & Lung (C1, P1)
- Discuss the microscopic structure of epiglottis, trachea & Lung (C1,P1)
- Identify tooth and tongue (C1, P1)
- Discuss the microscopic structure of tooth, lip and tongue (C1, P1)
- Identify the Duodenum & Ileum (C1, P1)
- Discuss the microscopic structure of Duodenum & Ileum (C1, P1)
- Identify the Large intestine & appendix (C1, P1)
- Discuss the microscopic structure of Large intestine & appendix (C1, P1)
- Identify the liver & pancreas (C1, P1)
- Discuss the microscopic structure of liver & pancreas (C1, P1)
- Identify the kidney, ureter & urinary bladder (C1, P1)
- Discuss the microscopic structure of kidney, ureter & urinary bladder (C1, P1)
- Identify the ovary & testis (C1, P1)
- Discuss the microscopic structure ovary & testis (C1, P1)

Radiology

- Identify the parts of bones of head & neck and paranasal air sinuses in radiographs (C1, P1)

Embryology models

- Discuss general embryology models
- Discuss embryology models of Pharyngeal arches, tongue and face nose and palate

Osteology

- Identify and Describe skull with all normas, cervical vertebrae, hyoid bone,
- Cranial cavity, different bones like Frontal, parietal, temporal, occipital, maxilla and mandible.
- Identify the cervical vertebrae (C1, P1)
- Describe the features and attachments of cervical vertebrae (C1, P1)
- Identify the foetal skull (C1, P1)
- Describe the features of foetal skull (C1, P1)
- Explain the applied anatomy of fetal skull (C2, P2)
- Identify the Sphenoid and Zygomatic bone (C1, P1)
- Describe the features and attachments of Sphenoid and Zygomatic bone (C1, P1)

Demonstration of arterial pulsation

- Identify arteries for Arterial pulsations - superficial temporal, facial, carotid, axillary, brachial, radial, ulnar, femoral, popliteal, dorsalis pedis (P1)
- Demonstrate the procedure (C1,P1)
- Demonstration of lumbar puncture
- Demonstration of muscles for intramuscular & vessels for intravenous injections
- Identify the site of lumbar puncture, epidural space, intervertebral space between L4 & L5 (P1)
- Describe the procedure of lumbar puncture (C1, P1)
- Identify the main muscles, bones & joints of upper limb (C1, P1)
- Identify the superficial veins (C1, P1)
- Describe the origin, course and termination of superficial veins (C1, P1)
- Describe the sites of intravenous injections (C1, P1)
- Identify the deltoid muscle & gluteal muscles (C1, P1)
- Explain the clinical importance of deltoid & gluteal muscles for intramuscular injection and its relation to nerves (C2, P2)

Demonstration of visceral organs, different parts of CNS and limbs

- Identify different parts of brain and spinal cord (C1, P1)
- Identify the heart & lung (C1, P1)
- Identify the various structures in upper and lower limbs
- Identify various organs in the abdomen & pelvis (C1, P1)

Environmental science

- Describe the method of disposal of dissected cadaver, organs and tissues (C1, P1)
- Describe the method of disposal of chemicals used in preservation (C1, P1)

REFERENCE MATERIAL

RECOMMENDED BOOKS:

1. B.D. Chaurasia's Human Anatomy- Vol III, 10th Ed, CBS publishers
2. Text book of Histology, 2nd Ed by Latha V. Prabhu, EMMESS
3. Inderbir Singh's Human embryology, 12th Ed by Subhadra Devi, Jaypee
4. B D Chaurasia's General Anatomy, 7th Ed.

REFERENCE BOOKS:

1. Snell's Clinical Anatomy for Medical students, 9th Ed, Wolters Kluwer
2. Gray's anatomy for students, 3rd Ed, Elsevier
3. Langman's Medical Embryology, 13th Ed, Wolters Kluwer
4. Di Fioire's Atlas of histology, 13th Ed by Victor P. Eroschenko, Wolters Kluwer
5. Cunningham's Manual of practical Anatomy- Vol III, 15th Ed by Romanes GJ, Oxford
6. Netter's Atlas of Human Anatomy, 6th Ed, Elsevier
7. Surface & Radiological Anatomy by A Halim, 3rd edition
8. Human Genetics, Gangane, 5th Edition

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Question Paper

Exam Date & Time: 19-Feb-2021 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST BDS DEGREE EXAMINATION - FEBRUARY 2021
SUBJECT: GENERAL ANATOMY INCLUDING EMBRYOLOGY AND HISTOLOGY

Marks: 60 **Duration: 165 mins.**

Essay Questions :

1)	Describe the temporomandibular joint under the following headings: a) type b) articular surfaces c) ligaments d) movements with muscles responsible (1+1+4+4 = 10 marks)	(10)
2)	Describe the Scalp under the following headings: a) layers b) blood supply c) nerve supply d) applied aspects (2+3+3+2 = 10 marks)	(10)
3.	**Write Short notes:**	
3A)	Maxillary Sinus	(4)
3B)	Fate of pharyngeal pouches	(4)
3C)	Histology of Tongue	(4)
3D)	Facial artery	(4)
3E)	Klinefelter Syndrome	(4)
3F)	Sternocleidomastoid muscle	(4)
3G)	Formation and relations of cavernous sinus	(4)
3H)	Histology of transverse section of bone	(4)
3I)	Boundaries of tonsillar fossa and gross features of tonsil	(4)
3J)	Enumerate contents of posterior triangle	(4)

GENERAL HUMAN PHYSIOLOGY

COURSE OUTCOMES (COS):

On successful completion of this course, students will be able to

CO 1: Explain the component of the cell and cell membrane, distribution and measurement of body fluids, components of blood and their functions, blood groups and blood transfusion. (C1, C2)

CO 2: Explain the normal functions of organ systems of the body (like Muscle nerve, Cardio Vascular, Respiratory, Excretory, Central nervous system, Special senses, Endocrine, Reproduction, Renal and Gastro Intestinal system) to facilitate an understanding of physiological basis of health & disease and the interaction of various organ systems (C1, C2)

CO 3: To perform

- Basic hematology tests (RBC count, WBC count, DLC, blood grouping, ESR, PCV, Test for hemostasis, hemoglobin estimation) (P2)
- Clinical examination of (Pulse, arterial Blood pressure measurement, auscultation of heart sound, Vital capacity, CNS, Respiratory, cardiovascular system examination (P2).
- To Demonstrate ECG recording & CPR (P1)

BLOOD AND BODY FLUIDS

1. Transport across the cell membrane

- Define Homeostasis (C1)
- Name the various transport mechanisms across cell membrane (C1).
- Describe passive transport mechanisms such as simple diffusion, facilitated diffusion and osmosis with examples (C2)
- Explain primary and secondary active transport mechanisms with examples (C2)

2. **Body fluid compartments**

- Mention the total body water as percentage of body weight and its distribution. (C1)
- Give the ionic composition of body fluids (C1)

3. Composition and functions of blood

- List the composition of blood (C2)
- List the functions of blood (C1)
- Define haematocrit/PCV, ESR & Blood indices (C1).
- Explain the morphology of RBCs (C2)
- Explain the normal count and variations (C1)

4. Plasma proteins

- Name the different types of plasma proteins (C1)
- List the functions of plasma proteins (C1)
- Explain the functions of plasma proteins (C2)

5. **Erythropoiesis**

- Describe the sites of erythropoiesis (C2)
- Describe the stages of Erythropoiesis (C2)
- Explain the factors regulating Erythropoiesis (C2),
- Explain RBC destruction, & classify jaundice(C2)

6. Hemoglobin,anemia

- Mention the normal values of Hemoglobin and its variations(C1)
- List the functions of Hemoglobin (C1)
- Define and classify anemias (Etiological and morphological) (C2)

7. White blood cells

- Classify White Blood Cells (C2)
- Mention the normal count and variations of WBCs (C1)
- Describe the morphology of various WBCs (C2)
- Describe the functions of WBCs (C2)
- Definition and types of WBCs (C1)

8. Hemostasis

- Mention the morphology of platelets, range of platelets and its variations. Discuss thrombopoiesis. (C1, C2)
- List the functions of platelets (C1)
- Define Hemostasis (C1)
- Describe the various stages involved in hemostasis (C3)
- List the clotting factors (C1)
- Describe the intrinsic and extrinsic pathways of coagulation(C3)
- Describe the Fibrinolytic system (C2)
- Explain Bleeding and clotting disorders (C2)
- Classify anticoagulants and give examples (C2)

9. Blood grouping

- Describe ABO and Rh systems of blood grouping (C2)
- Explain the importance of blood grouping and cross matching (C2)
- List the hazards of blood transfusions (C1)
- Explain the cause and clinical features of Erythroblastosis fetalis (C3)

NERVE MUSCLE PHYSIOLOGY

Physiology of neuron

- Describe the morphology of neuron (C2)
- List the different types of neurons (C1)
- Classification of nerve fibres based on diameter and conduction velocity (C2)

Membrane potential

- Describe Resting Membrane Potential (C2)
- Describe Action potential and Propagation of Action Potential (C2)
- Describe the ionic basis of action potential (C2)
- Describe salutatory conduction
- Describe compound action potential (C2)

Skeletal muscle & Smooth muscle

- Mention the differences between skeletal, cardiac and smooth muscle (C1)
- Describe the structure of skeletal muscle (C2)
- Mention the types of skeletal muscle (C1)
- Explain neuromuscular transmission in skeletal muscle (C3)
- Explain the excitation-contraction coupling in skeletal muscle (C3)
- Mention neuromuscular blockers (C1)
- Give the cause, symptoms and treatment of Myasthenia Gravis (C1)
- Mention the types of smooth muscle (C1)

CARDIO VASCULAR SYSTEM (CVS)

Organization of heart

- Describe the structure of heart (C2)
- Describe the innervations of heart and blood vessels (C2)
- Describe the properties of cardiac muscle (C2)

Cardiac cycle

- Define cardiac cycle (C1)
- State the normal duration of cardiac cycle (C1)
- Explain the various events occurring during a cardiac cycle with the help of graph (C3)
- Enumerate the differences between first and second heart sounds (C1)

Electrocardiogram

- Define electrocardiogram (ECG) (C1)
- Draw a labeled diagram of a normal ECG recorded from limb lead II (C1)
- Describe the waves and intervals of ECG (C2)
- Mention the uses of ECG (C1)

Heart rate

- Mention the normal value and variations of heart rate (C1)
- Describe the regulation of heart rate (C2)

Cardiac output

- Define cardiac output (C1)
- State the normal value of cardiac output and give Fick's principle of CO measurement (C1)
- Mention the variations of cardiac output (C1)
- Describe the regulation of cardiac output (C2)
- Mention the factors affecting venous return (C1)

Blood pressure

- Define blood pressure (BP) (C1)
- Give the normal value of BP (C1)
- Mention the factors influencing BP (C1)
- Mention the variations of blood pressure (C1)
- Describe the regulation of arterial blood pressure (C2)
- Define circulatory shock (C1)
- Classify circulatory shock giving examples (C2)
- List Salient features of coronary circulation(C1)

EXCRETORY SYSTEM

Introduction

- Describe the gross and microscopic structure of kidneys (C2)
- List the functions of kidneys (C1)
- Draw a labelled diagram of a nephron (C1)
- Mention the normal value of renal blood flow (C1)
- Explain the special features of renal blood flow (C2)
- Explain the components & functions of JGA (C2)
- Describe the Renin-Angiotensinogen- Aldosterone mechanism(C2)

Glomerular filtration

- Define glomerular filtration rate(GFR) (C1)
- Mention the normal value of GFR (C1)
- Explain the factors influencing GFR (C2)
- List the substances used for the determination of GFR (C1)

Reabsorption and secretion In renal tubules

- Describe tubular reabsorption of sodium, glucose and water (C3)
- Define tubular load, renal threshold and tubular/transport maximum (C1)
- Mention the normal values for tubular load, renal threshold and tubular/transport maximum (C1)

Mechanism of concentration/dilution of urine

- Describe the role of counter current multiplier and counter current exchanger in the formation of urine (C3)

Physiology of micturition

- Give the nerve supply to urinary bladder and their functions (C2)
- Describe the micturition reflex (C2)
- Mention abnormal bladders (automatic & atonic bladder) (C1)

Skin and temperature regulation

- List the functions of skin (C1)
- Mention the normal body temperature (C1)
- List the temperature regulating mechanisms on exposure to cold (heat gain mechanism) (C1)
- List the temperature regulating mechanisms on exposure to warmth (heat loss mechanism) (C1)

RESPIRATORY SYSTEM

Introduction to respiratory system:

- Explain the functional anatomy of the respiratory system (C2)
- Mention the muscles of respiration (C1)
- Describe the mechanism of inspiration and expiration (C2)
- Describe the intra-pulmonary and intra-pleural pressure changes during the various phases of respiration (C2)

Ventilation:

- Define compliance of the lungs. Give its normal value. List the factors determining the compliance(C1)
- What is surfactant? Give its composition. Mention the functions of surfactant (C1)
- Define pulmonary ventilation. Mention the normal value of pulmonary ventilation (C1)

• Define alveolar ventilation. Mention the normal value of alveolar ventilation(C1)
• Define dead space. Give its normal value (C1)

Lung volumes and capacities:
• Draw a labelled Spirogram (C2)
• Define various lung volumes and capacities (C1)
• Mention the normal values of lung volumes and capacities (C1)
• Define vital capacity (C1)
• Mention the significance of vital capacity (C1)
• Mention the factors affecting vital capacity (C1)
• Describe the timed vital capacity (FEV1) (C2)
• Explain the clinical significance of FEV1 (C2)

Exchange of gases
• Give the composition of air in atmosphere, inspired air, alveoli (C1)
• Describe the structure of respiratory membrane (C2)
• Mention the factors affecting diffusion of gases across it (C1)

Transport of gases:
• Mention the forms in which oxygen is transported in the blood (C1)
• Describe the oxygen-hemoglobin dissociation curve (C2)
• Mention the factors shifting the oxygen-hemoglobin dissociation curve to the right and to the left (C1)
• Mention the forms in which carbon dioxide is transported in the blood (C1)
• Describe the mechanism of carbon dioxide transport (C2)

Regulation of respiration:
• Explain the neural regulation of respiration (C3)
• Explain the chemical regulation of respiration (C3)

Applied aspects:
• Define hypoxia (C1)
• Mention the types of hypoxia (C1)
• Define cyanosis (C1)
• Mention the cause of cyanosis (C1)
• Define apnea, dyspnea and asphyxia (C1)

CENTRAL NERVOUS SYSTEM

General organization of nervous system:
• Outline the organization of nervous system (C1)
• Outline the organization of autonomic nervous system(ANS) C1)
• Enumerate the functions of ANS (C1)
• Mention the functional areas of cerebral cortex and their functions (C1)

Receptors:
• Classify sensory receptors according to type and location of stimulus, giving examples for each (C2)
• Explain the property of receptors

Synapse:
• Define 'synapse' (C1)
• Describe the structure of a synapse & explain the events in synaptic transmission (C2)
• List the properties of synapses (C1)

Reflexes:
• Define reflex and classify reflexes (C1)
• Enumerate the components of a reflex arc with the help of a diagram (C1)
• Describe the stretch reflex with the help of a diagram (C2)
• Describe withdrawal reflex with the help of a diagram (C2)
• Explain the importance of withdrawal reflex (C2)

Ascending pathways:
• Outline the general organization of sensory pathways (C1)
• Describe the dorsal column, lateral spinothalamic and anterior spinothalamic tracts with the help of labelled diagrams(C2)
• Mention the different sensations that are carried by the above pathways (C1)
• Explain referred pain and analgesic system (C2)
• Describe the sensory pathways from the face(C2)

Descending pathways:
• Describe the pyramidal/corticospinal tract with the help of a labelled diagram (C2)
• Describe the role of pyramidal tract in movement and in modification of stretch reflexes (C2)
• Tabulate the differences between 'upper motor neuron lesion' and 'lower motor neuron lesion (C2)

Cerebellum:
• Name the functional divisions of cerebellum (C1)
• Enumerate the functions of each lobe of cerebellum (C1)
• List the clinical features of cerebellar lesion (C1)
• Explain the physiological basis for clinical features of cerebellar lesion (C2)

Basal ganglia:
• Mention the components of basal ganglia (C1)
• Enumerate the functions of basal ganglia (C1)
• Describe the cause and clinical features Parkinson's disease (C2)
• Give the basis of treatment of Parkinson's disease (C1)

Thalamus and Hypothalamus:
• List the different nuclei of thalamus (C1)
• Explain the functions of thalamus (C3)
• Explain thalamic syndrome (C2)
• List the different nuclei of hypothalamus (C1)
• Explain the functions of hypothalamus (C2)

Cerebrospinal fluid:
• Describe the formation, circulation, absorption and functions of CSF (C2)
• Mention the method of collection of a sample of CSF and its indications (C1)

Special senses:

Vision:

- Describe the structure of human eye with the help of a diagram (C2)
- Name the photoreceptors (C1)
- Mention the functions of photoreceptors (C1)
- Draw the visual pathway (C2)
- Explain the defects in field of vision due to lesions of visual pathway at different locations (C2)
- Define accommodation reflex (C1)
- Describe the mechanism of accommodation (C2)
- Describe light reflex with the help of a diagram (C2)
- Describe the cause and correction for refractory errors of the eye (C2)
- Describe dark and light adaptation (C2)
- Explain Color Vision and color defects (C2)

Hearing:

- Give the structure of external, middle and inner ear
- Explain the functions of middle ear (C2)
- Describe the mechanism of hearing(C2)
- Describe the types of deafness (C2)

Explain the tests for hearing (C2)

Smell and taste:

- Name the receptors for taste (C1)
- Draw the taste pathway (C2)
- Mention the location of olfactory receptors (C1)
- Describe the structure of the olfactory mucosa using a diagram (C2) and olfactory pathway(C1)

ENDOCRINE SYSTEM:

General principles of Endocrinology:

- Name the major endocrine glands and their secretions (C1)
- Mention the chemical nature and transport of hormones (C2)
- Explain the mechanism of action of hormones (C2)
- Describe the regulation of secretion of hormones (C2)

Pituitary gland:

- Outline the connection between hypothalamus and pituitary. List the anterior pituitary hormones (C1)
- Describe the actions of growth hormone (C2)
- Describe the regulation of secretion of growth hormone (C2)
- Describe the cause and clinical features of gigantism (C2)
- Describe the cause and clinical features of acromegaly (C2)
- Describe the cause and clinical features of dwarfism (C2)
- List the hormones of posterior pituitary (C1)
- Describe the actions of posterior pituitary hormones (C2)
- Describe the regulation of secretion of ADH (C2)
- Describe diabetes insipidus (C2)

Thyroid gland:

- Describe the actions of thyroid hormones(C3)
- Describe the regulation of secretion of thyroid hormones (C2)
- Describe the cause and clinical features of hyperthyroidism (C3)
- Describe the cause and clinical features of cretinism (C3)
- Describe the cause and clinical features of myxedema (C2)

Adrenal cortex:

- Explain the actions of glucocorticoids (C2)
- Describe the regulation of secretion of glucocorticoids (C2)
- Explain the cause and clinical features of Cushing's syndrome (C2)
- Describe the actions of mineralocorticoids (C2)
- Describe the regulation of aldosterone secretion (C2)
- Describe the cause and clinical features of Conn's syndrome (C3)
- Describe the cause and clinical features of Addison's disease (C3)

Adrenal medulla:

- List the hormones of adrenal medulla (C1)
- Describe the actions of adrenal medullary hormones (C2)
- Mention the clinical features of pheochromocytoma (C1)

Parathyroid gland:

- Give the normal serum calcium level and list its function
- Define calcium homeostasis and list the hormones regulating it
- Describe the actions of PTH & regulation of secretion of PTH (C2)
- Describe the actions of calcitonin and vitamin D3 in regulating calcium homeostasis (C2)
- Describe the effects of parathyroidectomy (C3)
- Describe the effects of hyperparathyroidism (C3).

Endocrine pancreas:

- Describe the actions of insulin (C2)
- Describe the regulation of secretion of insulin (C2)
- Describe the cause and clinical features of diabetes mellitus (C2)
- List the actions of glucagon (C1)
- Describe the regulation of secretion of glucagon (C2)

REPRODUCTIVE SYSTEM

Male reproductive system:

- Explain Sex differentiation and Sex determination (C2)
- Outline the organization of male reproductive system (C1)
- Describe the structure and functions of testes (C2)
- Explain the different stages and factors effecting spermatogenesis (C2)
- Mention the actions of testosterone (C1)
- Describe the regulation of secretion of testosterone (C2)
- List the functions of sertoli cells

Female reproductive system:

- Outline the structure of female reproductive system (C1)
- Explain the actions of estrogen and progesterone (C2)
- Define Menstrual cycle. Give its phases(C1)
- Describe the ovarian and uterine endometrial, cervix and vaginal changes during menstrual cycle (C2)
- Explain the hormonal control of ovarian functions (C2
- Describe the indicators of ovulation (C2)

Pregnancy and lactation

- List the functions of placenta (C1)

• List the pregnancy tests(C1)
• Explain immunological test of pregnancy
• Name the hormone lacation (C1)
• Describe milk ejection reflex and Parturition reflex(C2)

Contraceptive methods
•Mention various contraceptive methods in males & females (C1)
• Explain the mechanism of action of various contraceptive methods(C2).

GASTROINTESTINAL SYSTEM

Saliva
• Give the general structure of G.I tract & innervation. (C1)
• Mention the composition of saliva (C1)
• Explain the functions of saliva (C2)
• Describe the regulation of salivary secretion (C2)
• List the abnormalities of salivary secretion (C1)

Deglutition
• Define mastication and deglutition (C1)
• Name and explain the stages of deglutition (C2)
• List the components of deglutition reflex (C1)
• List the abnormalities associated with deglutition(C2)

Stomach
• Describe the functions of stomach (C2)
• Mention the composition of gastric juice (C1)
• Describe functions of gastric juice (C2)
• Describe the mechanism of secretion of hydrochloric acid (C2)
• Describe the regulation of gastric juice secretion (cephalic, gastric and intestinal phases) (C3)
Describe the gastric motility (C3)

Liver and biliary system
• List the functions of liver(C1)
• Outline the composition of hepatic bile(C1)
• Describe the functions of bile(C2)
• Describe the regulation of biliary secretion(C2)
• Enumerate the functions of gall bladder(C1)
• What is enterohepatic circulation?

Exocrine portion of Pancreas
• Outline the composition of pancreatic juice (C1)
• Describe the functions of pancreatic juice (C2)
• Describe the neural and hormonal regulation of pancreatic juice (C2)

Small intestine and large intestine
• Explain different types of small intestinal movements and their significance(C2)
• List the functions of large intestine(C1);
• Explain the defecation reflex(C2)
• Explain briefly digestion and absorption of proteins, fats and carbohydrates (C2)

REFERENCE MATERIAL

RECOMMENDED BOOKS

• Essentials of Physiology for dental students-by K.S. Sembulingam -III edition

• Text book of Human Physiology for dental students-Indu Khurana – II edition

• Text book of Human Physiology for dental students- A K Jain

SAMPLE QUESTION PAPER

Question Paper

Exam Date & Time: 22-Feb-2021 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST BDS DEGREE EXAMINATION - FEBRUARY 2021

SUBJECT: GENERAL HUMAN PHYSIOLOGY AND BIOCHEMISTRY

- **Answer Section "A" and Section "B" in two separate answer books.**
- **Draw diagrams and flow charts wherever necessary.**

SECTION – A : HUMAN PHYSIOLOGY: 30 MARKS

Long Essay:

1A. Draw a labelled diagram to show the origin, course and termination of the pain pathway from the face. Add a note on referred pain.

(4+2 = 6 marks)

1B. Name the functional zones of the cerebellar cortex and mention the functions of each. List the features of cerebellar disease.

(3+1 = 4 marks)

2. **Short Essay:**

2A. Illustrate the intrinsic pathway of coagulation. Name any TWO commonly used in vivo anticoagulants and explain their mechanism of action.

2B. Describe how central and peripheral chemoreceptors regulate respiration.

2C. List the functions of saliva. Add a note on conditioned salivary reflex.

2D. Give the location and briefly explain the function of arterial baroreceptors.

2E. Give the cause and mention one important feature of each of the following conditions:

i) Acromegaly

ii) Cushing's syndrome

iii) Myxedema

iv) Central diabetes insipidus.

(4 marks × 5 = 20 marks)

GENERAL HUMAN BIOCHEMISTRY

COURSE OUTCOMES (COS):

On successful completion of this course, students will be able to

CO 1: Explain the chemistry and metabolism of proteins, carbohydrates, lipids, nucleic acids, porphyrins and their associated disorders with details of digestion and absorption of macronutrients.

CO 2: Illustrate the role of enzymes in metabolism with emphasis on their applications in clinical practice.

CO 3: Interpret the variations of biochemical parameters in blood to assess acid base balance, diabetes mellitus, liver and renal functions.

CO 4: Summarize the principle of nutrition, balanced diet, role of vitamins, minerals and associated disorders Summarize the principle of nutrition, balanced diet, role of vitamins, minerals and associated disorders.

UNIT 1: CLINICAL ENZYMOLOGY , CHEMISTRY, DIGESTION &ABSORPTION, METABOLISM OF PROTEINS, CARBOHYDRATES &LIPIDS

Introduction and Orientation

- Orientation of the students about the subject.

PROTEIN CHEMISTRY

- Classification of amino acids based on chemical nature), nutritional essentiality, metabolic products (C1, C3)
- Classification of proteins based on function, chemical nature (Composition), based on shape (C1, C3)
- Describe the four levels of structural organization of proteins- briefly (C1) Define denaturation of proteins (C1)
- Explain formation of peptide bond. List two important examples of biologically important peptides. (C1) Explain isoelectric point of proteins (C2)
- Classify the plasma proteins based on separation by electrophoresis (C3)
- List the functions of Albumin (C1)
- Brief description of structure & functions of immunoglobulins (C1)

PROTEIN Digestion &absorption

- Explain the process of digestion of dietary proteins in the GI tract (C2)
- Illustrate the process of zymogen activation in the GI tract (C2)
- List the transporters involved in the absorption of aminoacids (C1)

PROTEIN metabolism

- General metabolism of amino acids - Define Transamination, deamination & Transmethylation with the examples. (C2)
- Explain Ammonia metabolism - urea cycle (C2)
- List of important compounds derived from- Glycine, phenylalanine, tyrosine & tryptophan (C1)
- Identify the biochemical defect and clinical manifestations associated with Phenylketonuria, Alkaptonuria, Homocystinuria & Albinism (C1)

ENZYMOLOGY

- Define enzyme, coenzyme, cofactors & active site (C1).
- Classify enzyme with examples (C1) Illustrate activation of proenzymes(C2)
- Define enzyme specificity with examples - Group, Absolute, Optical specificity (C1, C2)
- Explain factors affecting enzyme activity. Give significance of Km (C2)
- Describe the features of competitive inhibition, and its application in medicine, features of non-competitive inhibition (C1, C3)
- Distinguish between competitive & non-competitive inhibition (C2)
- Comprehend the various mechanisms by which enzyme activity is regulated, viz., Allosteric regulation, Covalent modification and regulation by induction/ repression (C1, C2)
- Isoenzyme - Definition, different forms, clinical importance with respect to LDH & CPK (C1, C2)
- Give the diagnostic use of clinically important enzymes- AST, ALT, CPK, ALP, ACP (C2)

CARBOHYDRATE

Chemistry and digestion,absorption

- Definition, classification with examples (C2)
- Sources of important carbohydrates, Sugar & Derivatives (C1)
- Explain the structural & optical isomerism exhibited by sugars. (C2)
- Illustrate different types of isomerism (C1) Give suitable examples for epimers, anomers, D&L sugars (C1, C2)
- Define mutarotation, Inversion (Invert sugar), Aldose, Ketose isomerism. (C1, C2)
- Define Heteropolysaccharides. Give the functions of Mucopolysaccharides with examples and functions. (C1, C2).
- Explain the process of digestion of dietary carbohydrates in GI tract and mechanism of absorption of glucose (C2)
- List the types of Glucose Transporters. Explain the associated disorders- lactose intolerance (C2)

CARBOHYDRATE metabolism

- Describe Glycolysis under the following headings: Definition, site, subcellular site, Reactions, calculation of energetics & significance (C2)

- Sketch the Rapaport Leubering shunt & give its importance, Regulation of glycolysis (C2, C3)
- Describe the Citric acid cycle: Other names given to this pathway, site, subcellular site, reactions, energetics, regulatory enzymes. (C2, C3)
- Explain why TCA cycle is the final common pathway for metabolism (C2, C3)
- Describe gluconeogenesis - Definition, significance Reactions & recognize the importance of Cori's cycle (C1)
- Illustrate steps of glycogenesis and glycogenolysis – Significance, Describe glycogen storage disorders (Von Gierke's disease, Mc Ardle's disease only) (C2, C3)
- Describe the HMP shunt pathway; Site & subcellular site, Reactions of only the Oxidative phase of HMP shunt pathway, Importance of this pathway including G-6-PD deficiency. (C1, C2)
- Formation of glucuronic acid (C1, C2)
- Explain the mechanism of hormonal regulation of blood sugar (C2)
- Describe the signs, symptoms, metabolic derangements, complications seen in diabetes mellitus - a disorder associated with blood glucose regulation (C3)
- Interpret the evaluation of glycemic status - HbA1c, GTT (C2,C3)
- LIPIDS chemistry & digestion, absorption Definition, biological importance, classification of lipids with examples (C1)
- List out the functions of phospholipids (C2)
- Describe the ring structure of cholesterol- List the biologically important products formed (C1)
- Name the Bile salts and their function (C2)
- Explain the process of the digestion of lipids, importance of emulsification, formation of micelles, role of bile salts & the mode of absorption of lipids. Action of lipase in the process of digestion(C3)
- Sketch the Enterohepatic circulation of bile acids Explain steatorrhea - the associated disorder & Mention the causes(C1)
- LIPIDS metabolism
- Explain the process of oxidation of palmitic acid and its energetics(C2)
- Explain the metabolism of Ketone bodies - Formation, Utilization. Record the conditions when ketosis occurs (C1, C2)
- Generalize the process of fatty acid synthesis (requirement, I step, fatty acid synthase complex) (C2)
- Describe the steps involved in the process of lipolysis & lipogenesis in adipose tissue(C1)
- Generalize Cholesterol biosynthesis (till mevalonate in detail) (C2)
- List any two hypocholesterolemic drugs (C1, C2)
- Definition, Classification, composition, & functions of lipoproteins. (C2, C3)
- Relate the causes for atherosclerosis & CHD(C1)
- Memorize of the important lipid storage disorders and the biochemical defect associated (Niemann Pick disease, Gaucher's disease, Tay Sach's disease only). (C1)
- Explain the fluid mosaic model of Membrane structure and function (C2)
- Describe the various transport systems available (C2)

UNIT 2: BIOLOGICAL OXIDATION, ACID BASE BALANCE, PORPHYRINS, NUCLEIC ACID METABOLISM

Biological oxidation

- Describe the organization of ETC, sources of electrons (C1)
- List the electron carriers in sequence as present in the ETC (C1)
- Give the basis for the arrangement of carriers in the ETC (C2)
- Name the sites of ATP synthesis & inhibitors and example of one inhibitor at each of the sites (C1)
- Define Oxidative phosphorylation & High energy compounds (C1)
- List 3 high energy compounds (C1)

PORPHYRINS

- Describe the structure & function of Hemoglobin (C1)
- Define Hemoglobinopathies
- Identify the biochemical abnormality/defect in HbS & β thalassemia (C2)
- Explain the synthesis of heme – site, subcellular site and steps involved in the synthesis of heme (1st step and ferrochelatase step only) (C2)
- Describe the steps in the degradation of heme (C2)
- Explain the transport, uptake, conjugation & secretion of bilirubin; Formation & fate of urobilinogen (C2)
- Classify jaundice, Give the Causes for the different types of jaundice (C3)
- Interpret the Biochemical tests which aid in the differential diagnosis of jaundice (C2).

LFT & Detoxification

- List the various tests used in the assessment of liver function (C1)
- Interpret the important liver function tests which are done routinely (C2)
- Describe Plasma protein pattern & serum enzyme levels (C2,C3)
- Explain the two phases of detoxification : Mention the 4 mechanisms with 1 example each (C2)

NUCLEIC ACIDS

Chemistry

- Introduction to nucleotides, list the functions of nucleotides (C1)
- Describe and compare the Structure of DNA and RNA, forms and functions of RNA (C2)

NUCLEIC ACID

Metabolism

- Illustrate the process of replication, transcription& translation. List two inhibitors for each of them. Mention the action of antifolate drugs. (C2, C3)
- Record the salient features of the genetic code(C2)
- Define Mutation and list the effects of mutation(C2)
- Describe the missesense effect caused by HbS in detail (C2, C3)

CANCER

- Define cancer& name the causative factors (C1)
- Give two examples of carcinogenic viruses that promote cancer (C1)
- Define oncogenes and predict their role in the causation of cancer. (C2)

ACID BASE BALANCE

- List the blood buffers present in the body & their mode of action
- Explain the role of lungs, & the renal mechanisms in maintaining acid base homeostasis (C2, C3)
- List the disorders associated with 2 examples each(C2)
- Define anion gap and mention its significance in the evaluation of acid base imbalance (C1, C3)

UNIT 3: NUTRITION, VITAMINS, MINERALS, HORMONES, STRUCTURAL COMPONENTS

NUTRITION

- Define Calorimetry –. BMR, respiratory quotient specific dynamic action (C1)
- Give the energy requirements and its calculation in a normal individual (C2, C3)
- Summarize the nutritional aspects of carbohydrates, lipids and proteins(C2)
- Define, nitrogen balance, essential amino acids and fatty acids, dietary fibers (C1, C2)
- Define balanced diet, State the components of a balanced diet (C2)
- Describe protein calorie malnutrition, causes, & biochemical changes seen (C2)

VITAMINS

- Define the term vitamin, pro-vitamin. & antivitamin(C1)
- Compare the differences between fat soluble and water soluble vitamins (C2). Explain the chemistry, absorption biochemical functions, deficiency manifestations, dietary sources, & RDA for Vitamins A, D, E & K (C2, C3)
- Define Oxygen toxicity, types of free radicals and antioxidants (C1, C2)
- Discuss the chemistry, biochemical functions, deficiency manifestations, dietary sources, & RDA for B complex Vitamins & vitamin C (C1,C2)

MINERALS

- Discuss the metabolism of Calcium,phosphorus, Iron, Fluoride under the following headings –Sources, RDA, uptake, functions, disorders. (C1, C2)
- State the role of other trace elements (C1)
- Give a brief introduction to thyroxine synthesis. (C2)

HORMONES

Second messengers

- Give an overview of hormones (C1, C2)
- Define second messengers & list the various second messengers- cyclic AMP, calcium ions, Inositol triphosphate (C2)
- Describe the mechanism of action of steroid hormones. (C2, C3).

RFT

- Name the qualitative tests done for Routine urine analysis (C1)
- Mention the estimation of serum urea& creatinine (C1)
- Define clearance, Procedure for doing the creatinine & urea clearance test, calculation (C2,C3) Define proteinuria and tests used to diagnose it (C2, C3)

STRUCTURAL COMPONENTS

- Describe the structure & function of the connective tissue proteins Collagen and elastin (C1, C2)
- Identify the disorders associated with abnormal collagen structure (C1, C2)

UNIT 4 PRACTICAL

GENERAL REACTIONS of
Proteins, amino acids ,NPN substances, carbohydrates

- Perform Colour reactions of amino acids with the protein solution (C3,P2)
- Perform Reactions of NPN substances (C2,P2)
- Identify the NPN substances(C3,P3)
- Perform Reactions of Monosaccharides(Glucose & Fructose) (C2, P2)
- Perform Reactions of Disaccharides -Lactose & Sucrose)
- Perform Reactions of Polysaccharides -Starch, dextrin

COLORIMETRY

- Estimate total protein & albumin by colorimetry (C3,P3
- Estimate urine creatinine by colorimetry (C3,P3
- Estimate blood Glucose by colorimetry (C3, P3)

ANALYSIS OF BIOLOGICAL FLUIDS

- Analysis of Normal Urine (C3,P1)
- Analysis of abnormal urine (C3,P1)
- Analysis of saliva (C2)

ELECTROPHORESIS (DEMO)

- Serum protein electrophoresis (C2, P2)

SPOTTERS (CHARTS)

- GTT charts (C2,P1)
- Serum lipid profile- MI charts(C2,P1)
- Jaundice – Charts (C2,P1)
- Thyroid function tests- Charts(C2, P1)
- Acid Base disorders- spotters (P1)
- Parathyroid function tests(C2,P1)

.

REFERENCE MATERIAL

RECOMMENDED BOOKS

- Textbook of Biochemistry for Dental students, DM Vasudevan and Sreekumari, 4th edition
- Essentials of Biochemistry, U Satyanarayana, 3rd edition

REFERENCE BOOKS:

- Lippincott's illustrated Reviews, 7th edition: Biochemistry
- Essentials of Biochemistry, 3rd edition by Pankaja Naik

SAMPLE QUESTION PAPER

Question Paper

Exam Date & Time: 22-Feb-2021 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST BDS DEGREE EXAMINATION - FEBRUARY 2021

SUBJECT: GENERAL HUMAN PHYSIOLOGY AND BIOCHEMISTRY

- **Answer Section "A" and Section "B" in two separate answer books.**
- **Draw diagrams and flow charts wherever necessary.**

SECTION – B : BIOCHEMISTRY: 30 MARKS

3. **Essay:**

3A. Explain the formation and degradation of ketone bodies

3B. Describe the digestion of proteins in the GIT

(5 marks × 2 = 10 marks)

4. **Write Briefly on:**

4A. Steps of uric acid formation.

4B. Wald's visual cycle.

4C. Rapaport Leubering cycle

4D. Causes and compensatory mechanism of respiratory acidosis

(3 marks × 4 = 12 marks)

5. **Answer the followings:**

5A. Give any TWO examples of phase II reactions of detoxification

5B. Name the complexes of electron transport chain and mention the components of complex II

5C. Write the reaction catalyzed by LDH. Give the clinical significance of this enzyme

5D Define gluconeogenesis. Name the key enzymes of gluconeogenesis

(2 marks × 4 = 8 marks)

DENTAL ANATOMY, EMBRYOLOGY AND ORAL HISTOLOGY

COURSE OUTCOMES (COS):

On successful completion of this course, students will be able to

CO 1: Describe the development, morphology and histologic structure of the hard and soft tissues of the oral cavity along with the normal physiologic changes associated with them.

CO 2: Recognize the eruption pattern, chronology and illustrate the morphology of deciduous and permanent teeth.

CO 3: Relate the knowledge of the basic tissues in future clinical practice.

CO 4: Reproduce the anatomical morphology of the crown and root of permanent central incisor, lateral incisor, canine, premolars and first and second molars.

UNIT 1: ORAL HISTOLOGY INCLUDING EMBRYOLOGY

Introduction and Orientation

1. Orientation of the students about the subject.

Development of face

- Explain the development of branchial arches (C2)
- List the derivatives of branchial arches. (C1)
- Summarize the clinical implications of development of dental arches (C3)
- Describe the formation of face. (C2)
- Explain the formation of palate and tongue. (C2)
- Explain the development of maxilla and mandible. (C2)
- Relate the clinical implications of development of tongue and palate. (C3)
- Relate the developmental anomalies related to development of maxilla and mandible. (C3)

Revision

Development of teeth

- Illustrate the histology of bud, cap, bell and advanced bell stages of tooth (C2, P2)
- Explain types of Dental Lamina (C2)
- Explain the histology of Root formation (C2)
- Describe the transient structures present in cap stage (C1)
- Illustrate the histo-physiological process in tooth development along with clinical considerations(C3)
- Explain reciprocal induction that occur in tooth development (C2)

Revision

Enamel

- List the physical properties and chemical composition of enamel. (C1)
- Explain the ultrastructure of enamel (C2)
- Illustrate the light microscopic structures in enamel namely incremental lines, cross striations, enamel lamellae, enamel tufts, enamel spindle, gnarled enamel, Hunter Schreger bands (C2, P2)
- Explain the hypocalcified and surface structures of enamel (C2)
- Illustrate the clinical significance of the hypocalcified structures of enamel (C3)
- Explain changes in enamel seen with age (C2)
- List the different stages in the life cycle of ameloblasts (C1)
- Summarize the process of amelogenesis (Formation of enamel matrix, mineralization and maturation). (C2)
- Relate stages of life cycle of Ameloblasts with corresponding development of teeth (C3)
- Relate the clinical considerations with the structure of enamel (C2)
- Revision

Dentin

- List the physical and chemical properties of dentin (C1)
- Explain the histological structure of dentin (C2)
- Distinguish the various types of dentin (C2)
- Illustrate dentinogenesis (C2)
- List the age changes in dentin (C1)
- Explain the theories of dentinal hypersensitivity (C2)
- Relate the microscopic structures of dentin with their clinical significance (C2)
- Distinguish normal structures of dentin under microscope (C3, P2)

Pulp

- Identify the different types of dental pulp. (C1)
- Name the origin of dental pulp (C1)
- Describe the formation of dental pulp. (C2)
- Explain the anatomy of pulp chamber. (C2)
- Illustrate the Histological zones of the dental pulp. (C2, P2)
- Summarize the functions of dental pulp. (C2)
- Describe different types of pulp stones. (C2)
- Relate the clinical considerations of pulp. (C3)

Revision

Cementum

- List the physical characteristics and chemical composition of cementum (C1)
- Describe cementogenesis. (C2)
- Compare cellular and acellular cementum. (C2, P2)
- List the different types of cementum. (C1)
- Illustrate the types of cemento-enamel junctions. (C2, P2)
- Describe the functions of cementum (C2)
- Explain hypercementosis (C2)
- Compare the changes seen in cementum due to various external/internal influences. (C2)

Periodontal ligament

- List the components of periodontal ligament (C1)
- Explain the orientation, composition and functions of principal fibers of periodontal ligament (C2, P2)
- Describe Sharpey's fibres (C1)
- Describe cementicles (C1)
- Illustrate the functions of periodontal ligament (C2)
- Summarize the age changes of periodontal ligament (C2)
- Relate the clinical considerations of periodontal ligament with the histology (C3)

Revision

Alveolar bone

- Describe the histological features of alveolar Bone proper (C2, P2)
- Explain the process of bone remodelling(C2)
- Relate the microscopic structures bone remodelling of alveolar bone with their clinical significance (C2)

Revision.

Saliva + Salivary glands

- Classify salivary glands. (C1)
- Summarize the physical properties and chemical composition of saliva. (C2)
- Describe the functions of saliva. (C2)
- Illustrate the structure of serous, Mucous and Mixed salivary gland. (C2, P2)
- Describe the ductal system in salivary glands. (C2)
- Illustrate the histology of myoepithelial cells.(C2)
- List the functions of myoepithelial cells. (C1)
- Explain the formation of saliva. (C2)
- Summarize the ductal modifications of saliva. (C2)
- Relate the clinical considerations of salivary glands. (C3)
- Revision

Temporomandibular joint

- Comprehend the anatomy of TMJ and its relations. (C2)
- Explain the histology of Temporomandibular joint. (C2)
- Illustrate the biomechanics of the joint at rest and movement. (C2)

Maxillary sinus

- Describe the development of maxillary sinus (C2)
- Describe the developmental anomalies of maxillary sinus (C1)
- Describe the boundaries of maxillary sinus (C1)
- Explain the histology of maxillary sinus (C2)
- Describe the functions of maxillary sinus (C1)
- Relate the clinical considerations of maxillary sinus with its anatomy and histology (C3)
- Revision

Oral mucosa

- List the types of oral mucosa (C1)
- Describe the functions of oral mucosa (C2)
- Describe the location, clinical and histological characteristics of keratinized, nonkeratinized and Specialized Oral Mucosa. (C2, P2)
- Explain the structure, functions and clinical considerations of basement membrane (C3)
- Describe the characteristics of non-keratinocytes (C2)
- Comprehend the histological variations and characteristics of oral mucosa of gingiva, hard palate, softpalate, buccal mucosa, labial mucosa, tongue, floor of the mouth and the vermilion zone. (C2, P2)
- Illustrate the clinical significance of the histological variations of Hard Palate and Gingiva. (C3)
- Explain the differences in the histology of the non-keratinized and keratinized epithelium. (C2)
- Describe the types of gingival fibers. (C2)
- Illustrate the clinical significance of the histological appearance of Vermilion zone. (C3)
- Explain the histology of taste bud. (C2)
- Illustrate the development and shift of dentogingival junction. (C3)
- Comprehend the concept of attachment epithelium and epithelial attachment. (C2)
- Explain the various changes in oral mucosa that occur with aging. (C2)
- Comprehend the functions of the intra cytoplasmic components of keratinocytes. (C2)

Revision

Tooth eruption

- List the sequence of eruption of primary and permanent teeth (C1)
- Describe the theories of eruption of teeth (C2)
- Relate the tooth eruption with their clinical significance(C2)
- Shedding of deciduous teeth
- Describe the mechanism of exfoliation of teeth. (C1)
- Describe the morphology and function of Odontoclasts (C1)
- Relate the mechanism of exfoliation with their clinical significance(C2)

Revision

Preparation of tissue for histologic study

- Describe the steps in tissue processing (C2)
- Explain decalcification (C2)

Waste management and paraffin wax disposal

- Describe the process of safe segregation and disposal of biomedical wastes like chemicals (including formalin, Xylene, Alcohol, caustic acids), reagents (including stains, dyes, mordants, paraffin wax) (C2)

UNIT 2: DENTAL ANATOMY INCLUDING OCCLUSION

Nomenclature and Tooth Numbering System, Land marks and Morphology of permanent incisors and canines

- Name the dental formulae of human primary and permanent dentition. (C1)
- Illustrate the concept and process of Zigmondy Palmer, FDI and Universal tooth numbering systems. (C2)
- Identify a tooth or group of teeth by any tooth numbering system. (C1)
- Describe the landmarks with examples on primary and permanent teeth. (C2, P2)
- List the chronology of primary and permanent dentition(C1)

Revision

Permanent maxillary central incisors

- Describe the morphology of the permanent central incisor. (C2)

Permanent maxillary lateral incisors

- Describe the morphology of the permanent maxillary lateral incisor (C2)

- Illustrate the differences between central and lateral incisors. (C2)
- Revision

Permanent Mandibular central and lateral incisors

- Describe the morphology of the permanent mandibular central and lateral incisor (C2)
- Illustrate the differences between mandibular central and lateral incisor. (C2)
- Revision

Permanent maxillary canines

- Describe the morphology of the permanent Maxillary canine. (C2)

Permanent Mandibular canine

- Describe the morphology of the permanent mandibular canine. (C2)
- Illustrate the differences between the permanent maxillary and mandibular canine. (C2)
- Revision

Permanent maxillary 1st and 2nd premolars

- Describe the morphology of the maxillary 1st and 2nd premolars. (C2)
- Illustrate the morphological differences between the maxillary 1st and 2nd premolar. (C2)
- Revision

Permanent Mandibular 1st and 2nd premolars

- Describe the morphology of the mandibular 1st and 2nd premolars. (C2)
- Illustrate the morphological differences of the mandibular 1st , two cusp and three cusp type of the mandibular 2nd premolar. (C2)
- Revision

Permanent maxillary 1st molars

- Describe the morphology of the permanent maxillary 1st molar. (C2)
- Illustrate the difference between the Permanent Maxillary 1st molar and the deciduous maxillary second molar (C2)

Permanent Mandibular 1st molars

- Describe the morphology of the permanent mandibular 1st molar. (C2)
- Illustrate the difference between the Permanent Mandibular 1st molar and the deciduous Mandibular second molar (C2)
- Revision

Permanent maxillary 2nd and 3rd molars

- Describe the morphology of the permanent maxillary 2nd and 3rd molar. (C2)
- Illustrate the differences between the permanent maxillary 1st and 2nd molar. (C2)

Permanent Mandibular 2nd and 3rd molars

- Describe the morphology of the permanent mandibular 2nd and 3rd molar. (C2)
- Illustrate the differences between the permanent mandibular 1st and 2nd molar. (C2)

Revision

Occlusion

- Describe the occlusal and proximal contact relation of the permanent dentition. (C2)
- Describe the interarch relationships of teeth in deciduous and permanent dentition. (C2)
- Explain the spacing seen in the arches of deciduous and mixed dentition. (C2)
- Describe the compensating curves of the permanent arches. (C2)
- Describe the contact relation of interarch dentition during movement of jaws. (C2)

Deciduous dentition

- Describe the morphology of the deciduous dentition. (C2)
- Compare the morphology of the deciduous and permanent incisors, canines and molars. (C2)

Revision

Differences between permanent and deciduous dentitions

- Illustrate the differences in the physical characteristics, morphological features, histological features and sequence of eruption in deciduous and permanent dentition. (C2)

Estimation of age on casts

- Estimate the age of the cast based on the teeth present using chronology of tooth eruption(C3)

UNIT 3: ORAL PHYSIOLOGY

Calcium and phosphorus metabolism

- List the functions of Calcium and Phosphorous in human body. (C1)
- Comprehend the factors influencing the calcium availability in the blood. (C2)
- Explain the role of Vitamin D, Calcitonin and Parathormone in regulation of blood calcium levels. (C2)

Mineralization

- List the theories of mineralization. (C1)
- Explain the Booster, Seeding and Matrix vesicle theories of Mineralization (C2)
- Comprehend the various theories/mechanisms of mineralization in the formation of enamel, dentin, cementum and alveolar bone. (C2)
- `Revision

Mastication

- Recognize the structures involved in mastication. (C1)
- Explain the origin, insertion and function of the muscles of mastication. (C2)
- Illustrate the phases of mastication and the functions of the structures associated. (C3)
- Explain the Jaw Reflexes. (C2)

Deglutition

- Recognize the structures involved in deglutition. (C1)
- Explain the theories of deglutition.
- Revision

Physiology of speech

- List the components of speech. (C1)
- Describe the muscles of larynx involved in speech. (C1)
- Recognize the types of sounds and structures involved. (C1)
- Describe the mechanism of speech. (C2)

Physiology of taste

- List the various papillae of tongue and taste sensations. (C1)
- Describe the structure of tastebuds. (C1)

- Explain the gustatory pathway. (C2)
- Revision

UNIT 4: PRACTICAL

Carving
- Know to manipulate carving wax (P3)
- Reproduce the morphology of permanent maxillary and mandibular incisors (P3)
- Reproduce the morphology of permanent maxillary and mandibular canines (P3)
- Reproduce the morphology of permanent maxillary and mandibular premolars (P3)
- Reproduce the morphology of permanent maxillary and mandibular molars (P3)

Basic histology
- Know the basic histology of cells of epithelium and connective tissue (P1)
- Cells:
- Fibroblasts, fibrocytes and endothelial cells
- Fat cells, muscle cells, chondroblasts and chondrocytes
- Osteoblasts and osteocytes, osteoclasts
- Giant cells and macrophages, lymphocytes and plasma cells
- Goblet cells

Tissues
- Psuedostratified ciliated columnar epithelium
- Stratified squamous epithelium

Development of teeth
- Bud stage
- Cap Stage: Early cap stage, Late cap stage
- Early bell stage
- Advanced Bell stage – Incisor, Molar

Root Formation
- Differentiate the various morphological stages of tooth development microscopically (P1)

Enamel
- Enamel rods
- Striae of Retzius
- Enamel Lamellae
- Enamel Spindles, Enamel tufts, DEJ
- Neonatal line
- Hunter Schreger bands

Gnarled enamel
- Distinguish normal structures of enamel under microscope (P1)
- Dentin
- S- Shaped dentinal tubules
- Y-Shaped terminal branches of dentinal tubules
- Interglobular dentine,
- Tome's Granular Layer
- Dead Tracts
- Contour lines of Owen

Transverse section of dentine
- Distinguish normal structures of dentin under microscope (P1)

Pulp
- Normal Pulp,
- Free false pulp stones
- Attached false pulp stones

Diffuse calcification
- Know the normal histology of the pulp (P1)
- Distinguish different types of pulp stones under microscope (P1)

Cementum
- Acellular Cementum and Cellular Cementum,
- Sharpey's Fibres
- Cemento enamel junction
- Cementoenamel Junction Gap, Overlap, End to end join
- Show the differentiating features between them cellular and acellular cementum under the microscope(P1)
- Distinguish between various types of cement-enamel junctions (P1)

Periodontal Ligament
- Principal fibres of periodontal ligament
- Sharpey's Fibres

Transeptal Fibres
- Point out different Periodontal ligament fibres under the microscope (P1)
- Salivary glands
- Mucous, Serous and Mixed Salivary glands
- Illustrate various types of salivary glands under the microscope (P2)

Oral mucosa
- Gingiva,
- Buccal mucosa

Hard palate
- Soft Palate
- Vermillion border of lip
- Papillae: a) Circumvallate, b) Fungiform, c) Filiform
- Illustrate different types of oral mucosa, and tongue papillae by identifying under the microscope (P1)

Deciduous dentition
- Identify deciduous teeth (P1)
- Distinguish between deciduous and permanent teeth (P1)
- Point out the age of the mixed dentition cast based on chronology (P2)

Special stains
- Distinguish different structures seen using special stains (P1)
- Van Giesen's stain
- Periodic Acid Schiff stain
- Toluidine blue stain

Waste management and paraffin wax disposal
- Show the storage, manipulation and safe/legal method of biomedical waste management in the laboratory. (P1)

REFERENCE MATERIAL

RECOMMENDED BOOKS

1. Oral Histology: Orban's Oral Histology and Embryology (14th/15th Edition) by G.S. Kumar
2. Dental Anatomy: Wheeler's Dental Anatomy, Physiology and Occlusion (9th/10th Edition) by Major M Ash Jr.

3. Oral Physiology: Applied Oral Physiology (2nd Edition) by Christopher B. Lavelle

REFERENCE BOOKS:

4. Development Oral Histology and Embryology (4th/ 5th Editions) by A. R. Ten Cate
5. Ten Cate's Development, Oral Histology and Embryology (6th Edition) by A. Nanci
6. A Color Atlas & Textbook of Oral Anatomy by Berkovitz




SAMPLE QUESTION PAPER

Question Paper

Exam Date & Time: 24-Feb-2021 (02:15 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST BDS DEGREE EXAMINATION - FEBRUARY 2021
SUBJECT: DENTAL ANATOMY, EMBRYOLOGY AND ORAL HISTOLOGY

Marks: 60 **Duration: 165 mins.**

Answer all the questions.

1) Enumerate the hypocalcified structures of enamel. Describe in detail light microscopic features of life cycle of an Ameloblast. A 4 year old child had a fall and traumatized his deciduous maxillary central incisor which intruded into the socket. At 6½ years his permanent central incisor which emerged was hypoplastic. Describe the reason for the same.

(2+6+2 = 10 marks)

2) Describe in detail the morphology of Permanent Maxillary canine. Enumerate the differences between Permanent Maxillary and mandibular canine.

(8+2 = 10 marks)

3. **Write short notes on:**

3A) Cap Stage of tooth development (4)

3B) Circumvallate Papillae (4)

3C) 12 year-old boy showed eruption of mandibular second premolar, with evidence of hard structures at the interdental spaces. On radiographic evaluation, calcified structures resembling roots of the deciduous teeth were seen in the interdental spaces. Describe this clinical phenomenon. (4)

3D) Describe the histological differences between serous and mucous salivary glands (4)

3E) Occlusal aspect of Permanent Mandibular First Molar (4)

3F) Dentinal tubules (4)

3G) Muscles of mastication. (4)

3H) Labial aspect of permanent maxillary central incisor. (4)

3I) Describe the differences between the two morphological types of mandibular second premolar (4)

3J) Differences between cellular and acellular cementum (4)

BEHAVIORAL SCIENCES AND HUMANITIES PROGRAM

Manipal College of Dental Sciences (MCODS) Mangalore conducts a unique program called as the "Personality and Professional Development Program". This program is coordinated by Dr. Ashwin Rao, Associate Professor, Department of Paediatric and Preventive Dentistry. It has been developed envisioning the holistic development of undergraduate students starting 1st BDS through to 3rd BDS. The program has a two-pronged objective. The first is to help instill confidence into the student through various sessions on personality and life perspectives. This is directed at the 1st and 2nd BDS students. This includes modules on leadership, finance management, promotion of extracurricular skills among others. The second objective is directed at 3rd BDS students to enhance their professional development. Professionally related topics which are not covered in the mainstream dental curriculum are dealt here. These include clinical photography, patient communication and practice management among a host of other relevant topics.

RESULTS

Parents/Guardians can access the University Examination results, sessional examination results and attendance report on the Student portal: (http://slcm.manipal.edu): Parents and students can get information, about academic matters, tuition fee (future and dues), hostel dues by accessing this portal using Registration No/Date of Birth. Please also ensure that the Email ID/ Postal address is to be updated whenever there is a change. It is advised for the students and parents to regularly check the portal for updates and information.

DRESS CODE FOR STUDENTS

BOYS:

Trousers and collared shirt

Shoes and Socks

Clean white apron with name tag

PROHIBITED FOR BOYS:

T. Shirt

Tight fitting/ dirty jeans

Chappals/Sports shoes

Shorts

Ear rings

Torn trousers

Pony tails

Trousers with more than 4 pockets

GIRLS:

Formal wear dress like Salwar Kameez, Churidar

Formal foot wear

Hair (beyond shoulder length) to be tied up

Clean white apron with name tag

PROHIBITED FOR GIRLS:

Tight fitting/ dirty jeans

Torn trousers, Skirts, Shorts

Revealing deep tops/Spaghetti top/Sleeveless tops/Shirts /T shirts

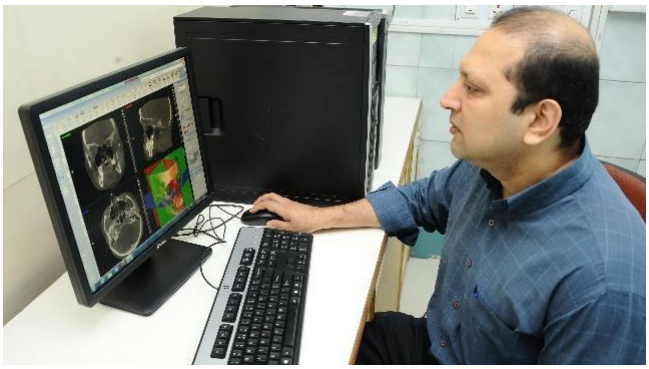
STUDENT AFFAIRS

The Administrative Office is situated within the college premises at Light House Hill Road, Mangalore. Students are advised to contact the Administrative Office for all administration related issues, hostel related issues, mess bill payment, etc. They may meet the Dean, Associate Dean, Chief Warden, and Deputy Director - Student Affairs in their respective offices situated in the college premises.

STUDENT WELFARE

The Deputy Director- Student Affairs will provide guidance and assistance to the students in all the activities related to student welfare programme. The student counseling centre is there to help the students in the time of need. Each student is issued an identity card which bears the students name, roll number and other details. This ID card serves as the source of identification of the student at the college campus, in the library, hostel, at University Examination and to avail Medicare facilities in an emergency. It may be used as a tool for identification even outside the college campus.

CONTACT:
Dr. Nithin Kumar
Deputy Director Student Affairs (Mangalore Campus),
Associate Professor, Community medicine KMC Mangalore
Office-0824- 2422271
Mob: +91 9591895839
Email: ddsa.mangalore@manipal.edu



Cone Beam Computerized Tomography (CBCT)

Therefore, students are required to carry their Identity Card at all times. Students during their professional course might face several situations of physical and psychological stress. In such situations a counsellor can help the students feel more comfortable in the new setup.

The Counselling Centre provides total privacy to the students and all the matters discussed are kept strictly confidential.

Computer Aided Designing and Machining (CAD-CAM)

RAGGING-STRICTLY PROHIBITED

Ragging is a criminal offence as per the Karnataka Educational Act 1983 and Hon'ble Supreme Court of India. MAHE ensures strict compliance on the prevention of Ragging of any form. Ragging is a criminal and Non-bailable offence. Ragging of students in any form is strictly prohibited within and outside the campus. The offenders are liable for punishment with imprisonment of up to three years and fine of up to 2.5 lakhs/-or may be even dismissed. There is an Anti - ragging squad in operation under the overall charge of the Dean. Students are advised to bring cases of ragging (either in the college campusor in the hostel) to the personal notice of the Dean, through the Deputy Director-Student Affairs / Teacher-guardian or through their respective hostel warden. If any incident of ragging comes to the notice of the authorities, the concerned student will be given the liberty to explain, and if his/ her explanation is not found to be satisfactory, he / she can be expelled from the institution.

ANTI-RAGGING COMMITTEE	
Dr. Ashita S. Uppoor, Dean (Chairperson)	9880038082
Dr. Junaid Ahmed, Associate Dean	9901470120
Dr. Arathi Rao, Associate Dean	9845242079
Dr. Nithin Kumar, Deputy Director, Student Affairs,MAHE Mangalore Campus	9591895839
Chief Warden ,Lt Col Ramanatha Shetty, MAHE,Mangalore Campus	0824-3535549 9902155882
Head, Legal, MAHE, Manipal	08202922807
Dr. Karthik Shetty, Warden, Kaprigudda Boys Hostel	9900008020
Dr.Nandita Shenoy, Warden, Attavar Ladies Hostel	9901730507
Dr. Nandita K.P., Associate Professor, Oral Pathology	9845332060
Mrs. Sheela Kamath, Senior Executive	9663723303
President, Students Association 2024-25	9019306671
Secretary, Students Association 2024-25	9148193752
I BDS Student Class Representative-Male (2024-25)	(will be intimated once elected)
I BDS Student Class Representative-Female (2024-25)	(will be intimated once elected)

ADMINISTRATIVE OFFICE

MS. SHEELA KAMATH

SENIOR EXECUTIVE

Mobile: 9663723303

sheela.kamath@manipal.edu

MS. DEEPA KAMATH

STUDENTS SECTION

Mobile: 9481769787

students.mcodsmlr@manipal.edu

MCODS, Mangalore, Light House Hill Road Ph No: 0824-2428716 (Extn:5604)

MS. ARCHANA

STUDENTS SECTION

Mobile: 8970721244

students.mcodsmlr@manipal.edu

MCODS, Mangalore, Light House Hill Road Ph No: 0824-2428716 (Extn:5604)

The above mentioned can be contacted for matters related to students like maintenance of records, examination-related work, matters related to foreign students, issue of marks cards, certificates etc.

TEACHER -GUARDIAN PROGRAMME

The Student - teacher guardian programme has been implemented for students of first year BDS. It is an efficient process of updating attendance and also having an insight into the various academic and personal issues that a student might face. This programme assigns a member of the teaching faculty to oversee the welfare of a group of students (one teacher guardian for 10 students in a group for I BDS and 25 students in a group for II, III and Final BDS).

Parents are free to contact them periodically to know the performance of the student. The teacher guardian can be approached for advice regarding academics, examination, and personal issues during their stay at Mangalore.

I BDS TEACHER GUARDIAN LIST 2024 BATCH

Sl. No.	Name of the Teacher Guardian	Designation and Department	Email and contact number
1.	Dr. Nandita K.P.	Associate Professor, Oral Pathology and Microbiology	nandita.kp@manipal.edu Mob: 9845332060
2.	Dr. Amitha J Lewis	Associate Professor, Oral Pathology and Microbiology	amitha.lewis@manipal.edu Mob: 9886280363
3.	Dr. Nidhi M	Associate Professor, Oral Pathology and Microbiology	manaktala.nidhi@manipal.edu Mob:8867503355
4.	Dr.Mranali Shetty	Associate Professor, Periodontology	mranali.shetty@manipal.edu Mob : 9611016900
5.	Dr. Shweta Yellapurkar	Reader , Oral Pathology	shweta.y@manipal.edu Mob: 9591955590
6.	Dr.Vignesh Kamath	Senior Lecturer, Prosthodontics	vignesh.kamath@manipal.edu Mob : 9036979107
7.	Dr. Ann Sales	Senior Lecturer, Prosthodontics	ann.sales@manipal.edu Mob: 9535410083
8.	Dr. Sandipan Mukherjee	Senior Lecturer, Prosthodontics	mukherjee.sandipan@manipal.edu Mob:9008722874
9.	Dr. Annapoorna Kamath	Senior Lecturer, Conservative Dentistry and Endodontics	annapoorna.kamath@manipal.edu Mob : 9964073926
10.	Dr Shivangi Vats	Senior Lecturer, Conservative Dentistry and Endodontics	shivangi.v@manipal.edu Mob : 9591334087

FOREIGN STUDENTS REGISTRATION PROCEDURES

The foreign students with Student Visa are required to register with the Superintendent of Police (SP) in Mangalore, within 15 days of their arrival. They are also required to inform the Superintendent of Police at Mangalore, a week prior to their departure from India. For the convenience of the students, the Office of the Superintendent of Police functions in Mangalore on the afternoons of every Wednesday and Saturday. Students are advised to note this facility and make appropriate use.

STUDENT HEALTH CLINIC

KMC, Hospital, Attavar. Phone No: 0824 2445858.
Casualty Ph. No: 5300 (Ext).
Ambulance Phone No: 9886033730 / 9739863994
The student health clinic is situated at Kasturba Medical College Hospital, Attavar, and Mangalore. All the students of MAHE are covered under MAHE Medicare Plan. This card entitles the bonafide students of MAHE for medical treatment (Out-patient/ In-patient) from the Doctors and the Hospitals under MAHE.

In case of ill health, students should report to Casualty at KMC Hospital, Attavar, Mangalore. Student's need to keep their parents as well as their teacher guardian informed about their health related problems. Students are advised to get treated in our own hospitals and avail the Medicare benefits

Casualty Numbers
KMC Hospital (Ambedkar Circle) 0824 2444777 Extn 5100, 5119
KMC Hospital (Attavar) 0824 2445858 Extn 5300

STUDENT FINANCE

Details of the course fee and hostel fee schedule for general category students of the institution for the academic year 2024-2025 will be displayed on our website www.manipal.edu > Academic> Fee Notification. The students are advised to pay course fee through the payment gateway (Fee Kart) the link of which will be provided through the student portal on the University website. Please note that from the academic year 2018- 19, the student has to mandatorily complete the Annual Registration process. The navigation of the same will be https://slcm.manipal.edu - login with your student ID> Dues> Annual Registration. Hostel deposit need not be paid again if there is no change in the type of hostel accommodation availed.

THE PAYMENT OF GENERAL CATEGORY FEE HAS TO BE MADE THROUGHONE OF THE FOLLOWING OPTIONS

I Option: online through the University website by logging in at https://slcm.manipal.edu-student
II Option: RTGS/NEFT. Transaction details has to be entered in https://slcm.manipal.edu-student / parent login> Dues >Bank transfer-RTGS/ N EFT. On confirmation, receipt will be generated online and sent to the registered mail ID of the student/parent.

DETAILS OF THE BANK

MANIPAL ACADEMY OF HIGHER EDUCATION - BANK DETAILS
Name of Beneficiary : Manipal Academy of Higher Education
Address: Manipal Academy of Higher Education Madhavnagar, Manipal-576104 Karnataka, India.
Phone: +91-820-2571201, 2922767, 2922581
Fax: +91-820-2570065
Beneficiary Bank Details: ICICI Bank Ltd Manipal Branch Kasturba Hospital Complex, Manipal, Karnataka, India
Phone: 0820 257503/54-
Beneficiary Account# (INR A/c): 007201000089
IFSC Code#: ICIC0000072

ASSISTANT MANAGER

Ms. Sunanda Hebbar, Assistant Manager Finance department MCODS, Mangalore, Tel No: 0824-2422271 (Ext: 5515), Mobile: 9448351991,
Email: sunanda.hebbar@manipal.edu

MCODS MANGALORE CONTACT DETAILS

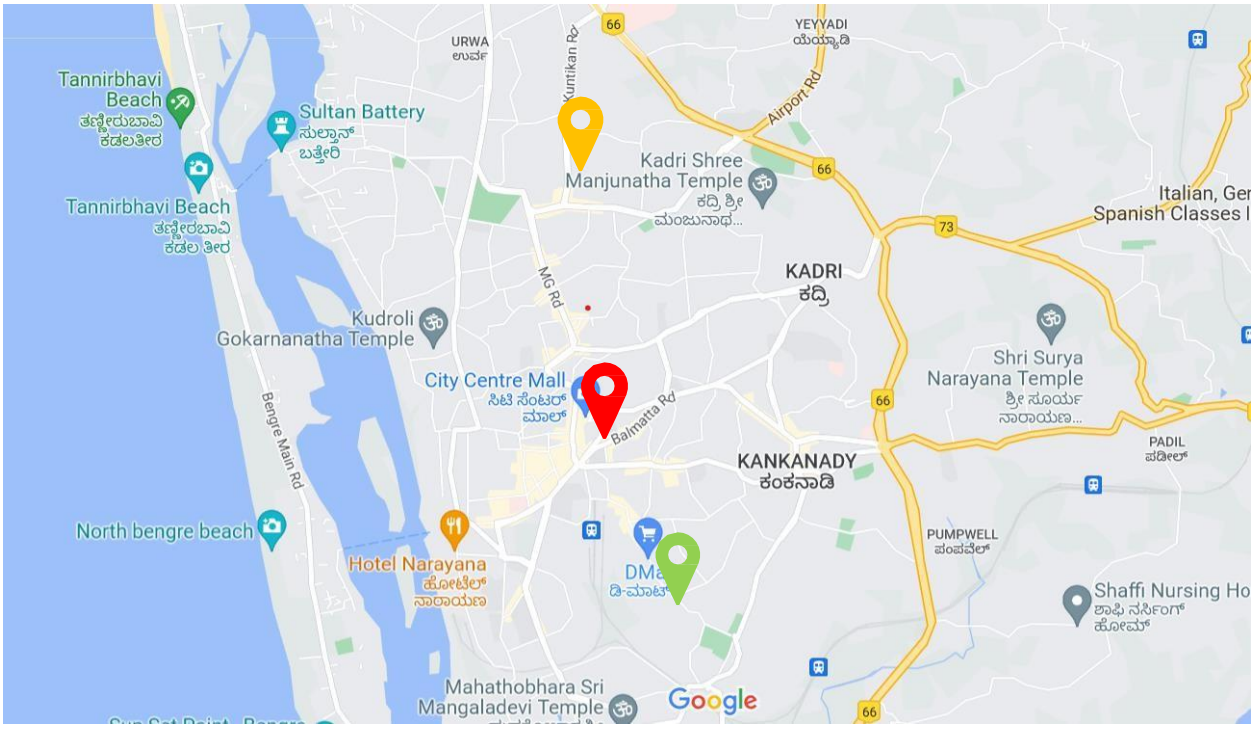
DESIGNATION	ADDRESS	CONTACT NUMBERS
DEAN **Dr. Ashita Uppoor** dean.mcodsmlr@manipal.edu	Office of Dean,MCODS, Mangalore	**0824-2422653 [PI]** **Cell: 9880038082**
ASSOCIATE DEAN **Dr. Junaid Ahmed**	Professor, Department of Oral Medicine & Radiology, MCODS, Mangalore	**0824-2428716** **Ext. 5601** **Cell : 9901470120**
ASSOCIATE DEAN **Dr. Arathi Rao**	Professor, Department of Paediatric & Preventive Dentistry, MCODS, Mangalore	**0824-2422271** **Cell: 9845242079** **Ext.5602**
DEPUTY DIRECTOR STUDENT AFFAIRS **Dr. Nithin Kumar**	Associate Professor, Community medicine KMC Mangalore	**9591895839**
MEDICAL SUPERINTENDENT	KMC Hospitals, Mangalore	**0824-2286210**
CHIEF SECURITY OFFICER	KMC, Mangalore LHH Road cso.mlr@manipal.edu	**0824 2427976** **Extn. 5544**
SENIOR EXECUTIVE **Ms. Sheela Kamath**	MCODS, Mangalore, LHH Road sheela.kamath@manipal.edu	**0824-2428716,** **Ext. 5605**
ASSISTANT MANAGER-FINANCE **Ms. Sunanda Hebbar**	MCODS, Mangalore, LHH Road sunanda.hebbar@manipal.edu	**0824-2428716,** **Ext. 5515**
STUDENTS SECTION **Ms. Deepa Kamath and Ms. Archana**	**MCODS, Mangalore, LHH Road** **students.mcodsmlr@manipal.edu**	**0824-2428716,** **Ext. 5604**

DETAILS OF HOSTEL WARDENS, MANGALORE

	NAME AND DESIGNATION	CONTACT NO.	EXTN. NO.	EMAIL
CHIEF WARDEN (I/C)	Lt Col Ramanatha Shetty WARDEN	9902155882	0824-3535549	chiefwarden.kmcmlr@manipal.edu
BEJAI LADIES HOSTEL	Dr. Ashwin R Rai Assoc Prof. of Anatomy	8197137975		ashwin.rai@manipal.edu
	WARDEN- Dr. Rashmi K S Assoc Prof. of Physiology	9901729728	0824-2222763	rashmi.ks@manipal.edu
	MATRON- Mrs. Chanchala	9481017558	Extn.5879	bejai.ladieshostel@manipal.edu
BEJAI BOYS BLOCK	WARDEN- Dr. Pratik Kumar Chatterjee Assoc Prof. of Physiology	8746010903	0824-2422271 Extn.5861	pratik.chatterjee@manipal.edu
	MANAGER- Mr. S Kumar	9448869605	Extn. 5875	bejai.hostel@manipal.edu

College/ Hostel Timings at Centre for Basic Sciences , Bejai:	
Breakfast (at the mess)	7:30am -9:00am
Academic Schedule	9:00am -1:00pm
Lunch (at the mess)	1:00pm -2:30pm
Academic Schedule	2:30pm -5:00pm
Tea (at the mess)	5:00pm -6:00pm
Dinner (at the mess)	7:30pm -9:00pm
Library	9 :00am -8:30pm
Reporting time to Respective Hostels by 9.00 pm on all days.	
Hostel Landline numbers :	
Boys: 0824 2211768	
Girls : 0824 2222763	

Our curriculum imparts holistic development to the student by incorporating extracurricular and co-curricular activities in the academic calendar. Soft skills development in the form of effective patient communication, gender sensitization, learning of the local language are part of the personality development programme. Students do their bit of social service by contributing to "DISHA" (Direction in Society for Human Awareness) and VSO (Voluntary Service Organization). A week long cultural and literary extravaganza identifies the hidden talents of the students. Extra-curricular activities include Inter- University sports meet and 'UTSAV" an annual cultural fest organised by the university which nurtures the student talents.



Center for Basic Sciences, Bejai, Mangalore

MCODS Light House Hill Road Mangalore

MCODS Attavar, Mangalore

Administrative Office:

Light House Hill Road, Mangalore Phone:

0824 – 2428716 or 0824-3535604
Email: codsmng@manipal.edu Website:
www.manipal.edu