Avicenna Medical & Dental College

AVICENNA
DENTAL COLLEGE

STUDY GUIDE

2023-2024



Program: Bachelor of Dental Surgery
Year: 1st Professional Year
Subject: Biochemistry
Batch No: D23
Session: 2023-2024

Department of Dental Education

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Introduction to Study Guide

Welcome to the Avicenna Dental College Study Guide!

This guide serves as your essential resource for navigating the complexities of your dental education at Avicenna Medical & Dental College. It integrates comprehensive details on institutional framework, curriculum, assessment methods, policies, and resources, all meticulously aligned with UHS, PMDC and HEC guidelines.

Each subject-specific study guide is crafted through a collaborative effort between the Department of Dental Education and the respective subject departments, ensuring a harmonized and in-depth learning experience tailored to your academic and professional growth.



OBJECTIVES OF THE STUDY GUIDE

1. **Institutional Understanding:**
    - Gain insight into the college's organizational structure, vision, mission, and graduation competencies as defined by PMDC, setting the foundation for your educational journey.
2. **Effective Utilization:**
    - Master the use of this guide to enhance your learning, understanding the collaborative role of the Department of Dental Education and your subject departments, in line with PMDC standards.
3. **Subject Insight:**
    - Obtain a comprehensive overview of your courses, including detailed subject outlines, objectives, and departmental structures, to streamline your academic planning.
4. **Curriculum Framework:**
    - Explore the curriculum framework, academic calendar, and schedules for clinical and community rotations, adhering to the structured guidelines of UHS & PMDC.
5. **Assessment Preparation:**
    - Familiarize yourself with the various assessment tools and methods, including internal exam and external exam criteria, and review sample papers to effectively prepare for professional exams.
6. **Policies and Compliance:**
    - Understand the institutional code of conduct, attendance and assessment policies, and other regulations to ensure adherence to college standards and accrediting body requirements.
7. **Learning Resources:**
    - Utilize the learning methodologies, infrastructure resources, and Learning Management System to maximize your educational experience and academic success.

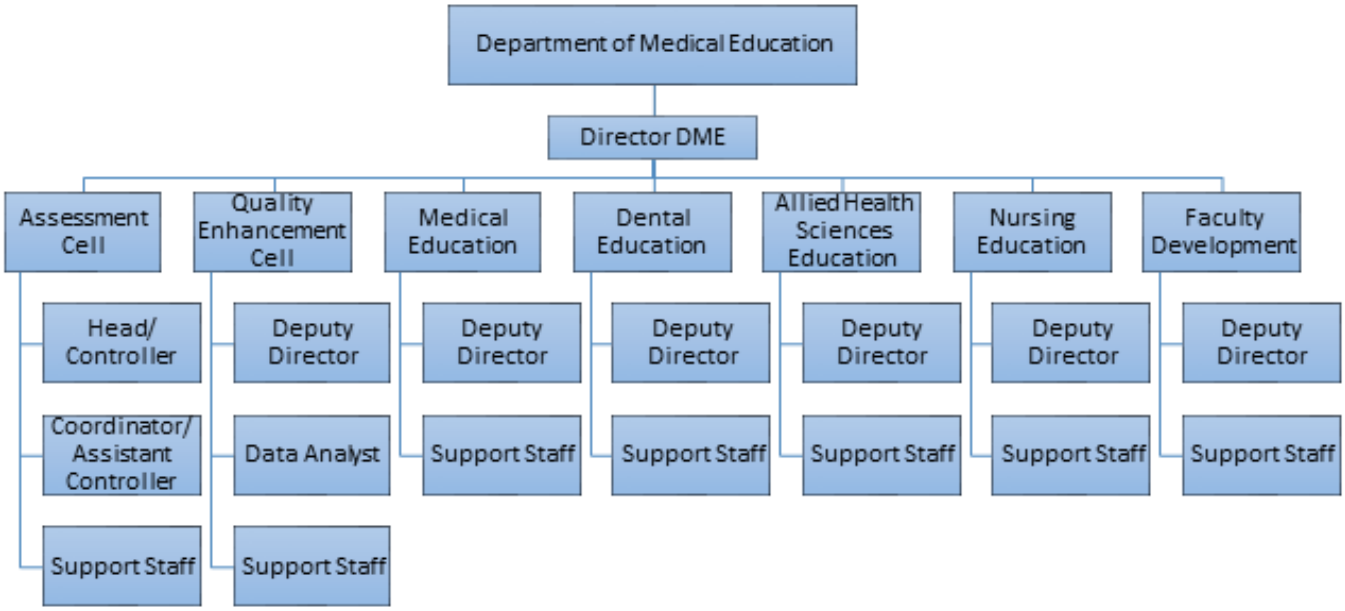
This guide, meticulously developed in collaboration with your subject departments, is designed to support your academic journey and help you achieve excellence in accordance with the highest standards set by PMDC and HEC.

DEPARTMENT OF MEDICAL EDUCATION

The Department of Medical Education (DME) serves as a cornerstone in delivering effective and high-quality education to both undergraduate and postgraduate medical and dental students. The DME is integral to the implementation and adoption of the latest curriculum provided by UHS and is responsible for organizing and managing related academic activities.

The DME will oversee the spirals of PERLs and C-FRC and monitor students' portfolio development and logbook completion. Additionally, the department is developing a mentoring platform and plans to initiate faculty development training which will focus on mentorship, reflective writing, and portfolio development skills. DME has a duty to collaborate with other disciplines to ensure that AVMDC students are not only competent in their respective fields but also well-trained in affective domains such as professionalism, ethics, research, and leadership.

A key responsibility of the DME is to plan and implement an effective training competency acquisition framework in collaboration with the academic council.



General Responsibilities of DME include:

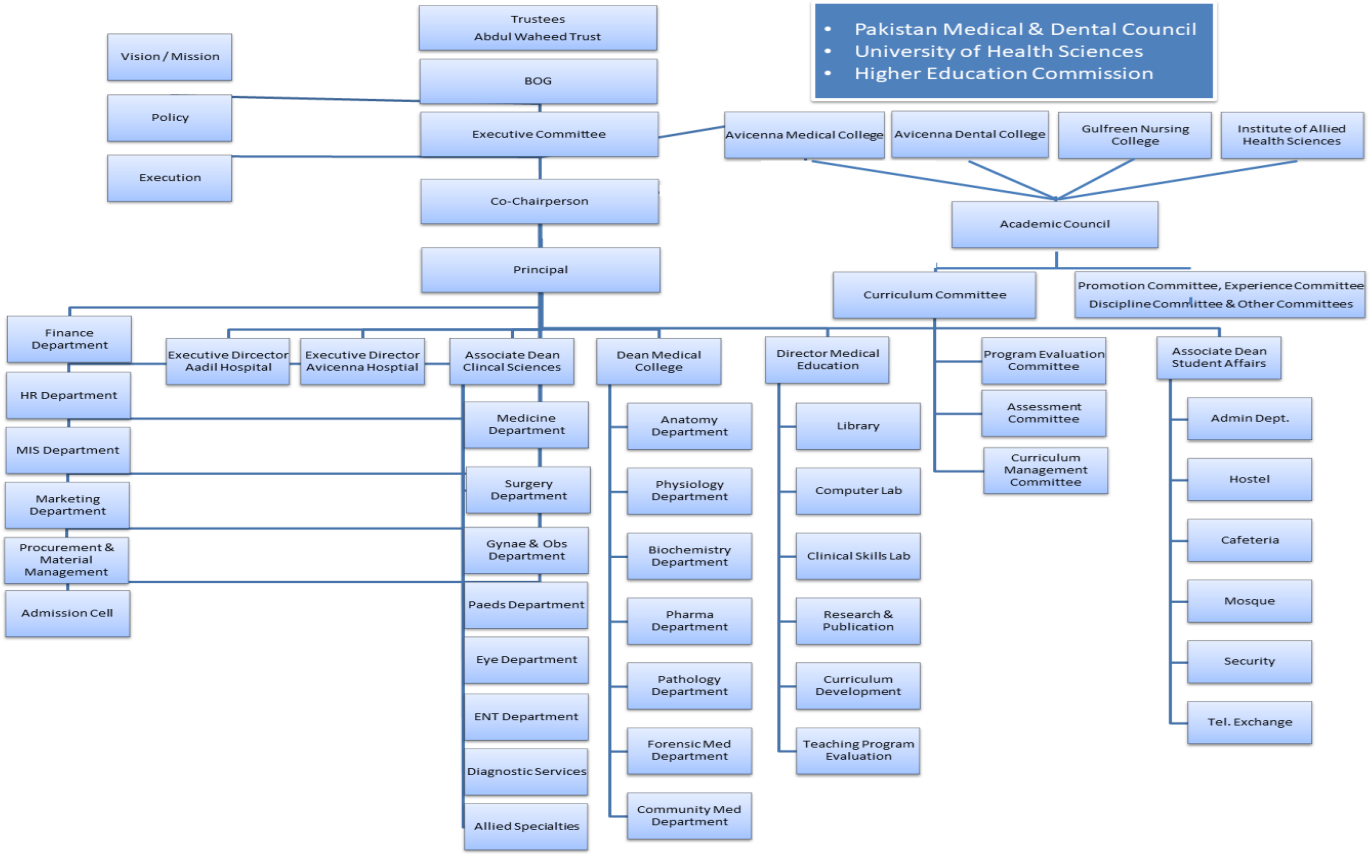
- Contribute and design, train the trainer activities which fulfill the need for undergraduate and postgraduate training.
- Shape and develop medical education research activities of the college.
- Facilitating & organizing workshops, seminars, symposia & conferences.
- Conducting CME activities to leverage culture of awareness, journal club.
- Networking by representing the college, when needed, in national /international meetings or conferences.
- Student counseling.
- Supervising students' academic progress.
- Academic Committees Development and Support.
- Staff Support and Development.
- Curriculum development and reform.
- Collaborate with curriculum committee and faculty members to develop quality instructional material such as modules, lecture, or study guides.

- Standard Operating Procedures for DME development.
- Skill lab management.
- Assessment analysis which includes blue printing, pre-exam review, item analysis and standard setting and provides feedback to concerned faculty and students on the learning outcome achievement.
- Develop and conduct periodical review of process of the program, learning and teaching activities, and assessment process.
- Identify opportunities for use of IT in teaching and learning, assessment and faculty development activities.
- Exam Cell management.
- Quality Assurance Cell management.
- Record keeping of departmental data.
- Leadership and management.
- Participation in overall planning and management of teaching in liaison with the departments.

Faculty	**Department**
Director / Head of Department Department of Medical Education	Dr. Gulfreen Waheed
Assistant Director / Assistant Professor Medical Education	Dr. Saman Fatima
Coordinator Medical Education	Dr. Javaid Shabkhaiz Rab
Deputy Director / Demonstrator Dental Education	Dr. Salar Arsalan
Deputy Director / Demonstrator Allied Health Sciences	Dr. Talha
Deputy Director / Demonstrator Nursing Education	Dr. Muneeba

Avicenna Medical & Dental College Overview

Institutional Organogram



Vision & Mission

AVICENNA MEDICAL COLLEGE

Avicenna Medical & Dental College

AVICENNA DENTAL COLLEGE

Vision

The vision of **Avicenna Medical & Dental College** is to become a college that thrives to achieve improvement in healthcare of masses through creative delivery of educational programs, innovative research, commitment to public service and community engagement in a environment that supports diversity, inclusion, creative thinking, social accountability, life-long learning and respect for all.

Mission

The mission of **Avicenna Medical and Dental College** is to educate and produce competent, research oriented healthcare professionals with professional commitment and passion for life-long learning from a group of motivated students through quality education, research and service delivery for the improvement of health status of the general population.

Message from the Chairman

The Avicenna Medical & Dental College is a project of Abdul Waheed Trust which is a Non-profitable, Non-governmental, Non-political & Social organization, working for the welfare of Humanity and based on Community empowerment. Avicenna Medical College has its own 530 bedded Avicenna teaching Hospital (Not for Profit hospital) within the College Campus & 120 bedded Aadil Hospital, at 15 minutes distance. Separate comfortable hostels for boys & girls are provided on the campus.

Our students benefit from the state of the art College Library with facilities of Internet & online Journals that remain open 15 hours a day, for our students & faculty members. I am particularly pleased with the hard work by the Faculty and Students in the achievement of historic 100% results for all the classes. It is a rare achievement and speaks of dedication of the Faculty and Staff. Our motto is Goodness prevails and we aim at producing Doctors' who are knowledgeable, competent in clinical skills and ethical values.

Avicenna Medical College & Hospital was founded to provide quality health care services to the deserving patients belonging to the rural areas near Avicenna Hospital as well as to provide quality medical education of international standard to our students. The Hospital provides all medical services and Lab diagnostics to the local population at minimal cost. So far by the grace of Allah Almighty the number of patients being treated and operated upon at our Hospital is increasing every day as there is no other public or charity hospital in the circumference of 20km. We have already established two Satellite Clinics in the periphery which are providing outdoor care while admission cases are brought to the Hospital in Hospital transport.

Following the success of our reputable Medical College and Hospital, we were able to successfully establish Avicenna Dental College which is recognized by the Pakistan medical & Dental Council & University of Health Sciences. To date, we have enrolled five batches in our dental college and we aim to achieve the same level of success for our dental students as our medical students.

Chairman
Abdul Waheed Sheikh
Avicenna Medical & Dental College



Message from the Principal



Prof. Dr. Sohail Abbas Khan
Principal Dental College
MDS, Dip Op (Hons) BDS

It is a matter of immense honor and privilege as the first Principal of Avicenna Dental College to welcome you to one of the finest dental institutes in the private sector of Pakistan. Avicenna Dental College is a private dental college, which aims to provide the finest dental education to dental undergraduate students in accordance with the latest trends in Dental Education, and to develop them to practice dentistry in the 21st century.

While educating dental students to become licensed, empathetic and competent professionals, Avicenna Dental College endeavors to educate students in a supportive environment in which they provide dental care for a diverse populace. In the times to come, we wish to transform our graduates into unfeigned teachers, researchers and consultants by starting post-graduation programs as well.

Avicenna Dental College aims to achieve an enterprising curriculum integrating the basic sciences with clinical experience while utilizing modern technological modalities.

In addition to the production of outstanding oral health professionals, we at Avicenna Dental College recognize our responsibility as a private dental institution to the citizens of the country in making the provision of oral health care available to those who are deprived of ready access.

I feel proud to lead this dental establishment such an inspiring time and hope all of you at Avicenna Dental College will share this pride and play your respective roles in materializing the dream of making this institution the premier dental educator in Pakistan



Message from the Vice Principal

Prof. Dr. Usman Muneer
Vice Principal Dental College
BDS, FCPS

It is a matter of great privilege to be associated with Avicenna Dental College. Our institution boasts of renowned, well-qualified and devoted faculty members in each and every specialty of dentistry. We are looking forward to diligently equipping our undergraduates with comprehensive artistic and ethical oral health care.

Our goal is to inspire a lifelong passion for learning and innovation in our students, ensuring they are well-prepared to meet the evolving challenges of the dental profession. I look forward to collaborating with our students on this transformative journey, guiding them toward achieving excellence in oral health care.

7-Star Doctor Competencies (PMDC)

According to national regulatory authority PMDC, a Pakistani medical/dental graduate who has attained the status of a 'seven-star doctor' is expected to demonstrate a variety of attributes within each competency. These qualities/ generic competencies are considered essential and must be exhibited by the individual professionally and personally.

1. Skillful / Care Provider.
2. Knowledgeable / Decision Maker.
3. Community Health Promoter / Community Leader.
4. Critical Thinker / Communicator
5. Professional / Lifelong learner.
6. Scholar / Researcher
7. Leader/ Role Model / Manager



About Avicenna Dental College

Avicenna Dental College is a purpose-built, fully equipped Dental institution with experienced and excellence-driven faculty to train high-quality dental professionals in Pakistan.

Avicenna Dental College runs under the umbrella of Abdul Waheed Trust. Abdul Waheed Trust is a non-profit social welfare organization and registered under the Societies Act with the Registrar of Societies. The Trust is legalized through a Trust Deed that bears necessary rectifications. The Trust Deed is further supported by its Memorandum and Article of Association that authorizes the establishment and operation of the Medical College, the Dental College, the Nursing College, the Allied Health Sciences College, and other activities in the healthcare sector.

In 2018, Avicenna Dental College was recognized by the Pakistan Medical & Dental Council. With the advent of advanced tools and technology in every field of health science, dentistry today has shot up to the greater end of the gamut with superior choice and promises in dental therapy in the very vicinity of the common man. ADC promises to be one such neighborhood.



Department & Subject Overview

Note from the Head of Department

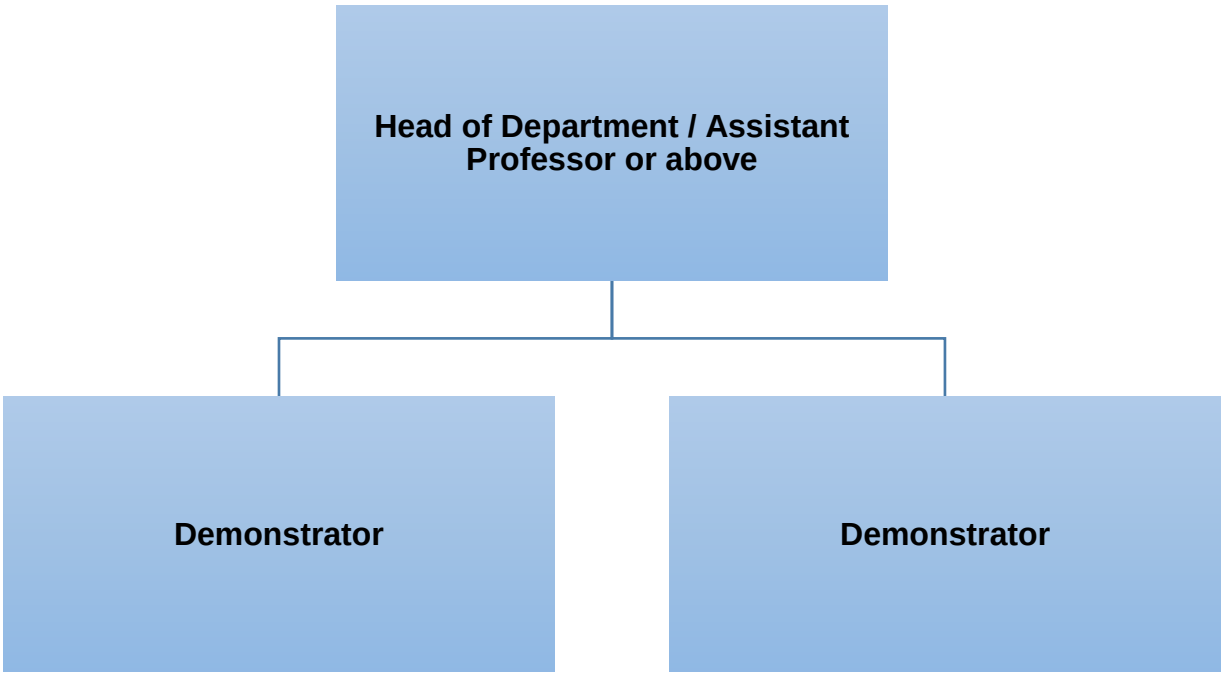
Bio-Chemistry relates to the Chemistry of and relating to Biological Organisms. It acts as a bridge between Biology and Chemistry by demonstrating how chemical reactions and structures give rise to life and life processes. The spacious laboratory has spectrophotometer, colorimeters, photometer analytical, electrophoresis, pH meters,

centrifuge machine, electronic balances, microscopes, incubators, water bath, distillation unit, automated pipettes and dispensers, to facilitate the practical demonstration of concepts.

The Clinical biochemistry laboratory (clinical lab) at Avicenna Medical College & Avicenna Hospital is also equipped to facilitate the learning of students. It has clinical chemistry analyser, haematology analyser and blood gas analyser to enhance effective student learning and understanding of blood samples and tests. A maximum of 60 students can occupy the huge biochemistry lab at one time. The highlighted equipment is sufficient for qualitative & quantitative analysis of samples for undergraduates.

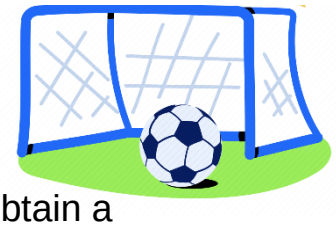
Prof. Dr. Sadia Aamir
Professor & Head of Department
Department of Biochemistry

Departmental Organogram (as per PMDC guidelines)



Faculty Members

Name	Designation	Qualification
Prof Dr Sadia Amir **Prof. Dr Haroon Habib**	Head of Department / Associate/Assistant Professor	**MBBS, Mphil** **MBBS, Mphil, Phd Scholar**
Dr Yusra Leghari	Senior Demonstrator/ Demonstrator	**BDS, Mphil**
Dr Sadia Khalil	Senior Demonstrator/ Demonstrator	**MBBS, Mphil (Scholar)**



Goal of the Department

To provide aspiring molecular life scientists with the opportunity to obtain a world-class education by engaging in a program of instruction that emphasizes critical thinking; rigorous and effective application of the scientific method; quantitative analysis; fundamental chemical, biological, and physical principles; clear and accurate written and verbal communication; and intensive experiential learning activities.

To generate new tools and knowledge that will advance our understanding of the living world and enhance the quality of life through better medical care, disease prevention measures, and nutrition.

To provide students with opportunities to participate in genuine, challenging experiential learning activities involving state-of-the-art approaches and technologies.

To enhancing public understanding of biochemistry, molecular biology, and science in general through public engagement via presentations, publications, and outreach programs.

To provide education, training, and work environments that are characterized by mutual respect, personal responsibility, fairness, equality, commitment and support for all.

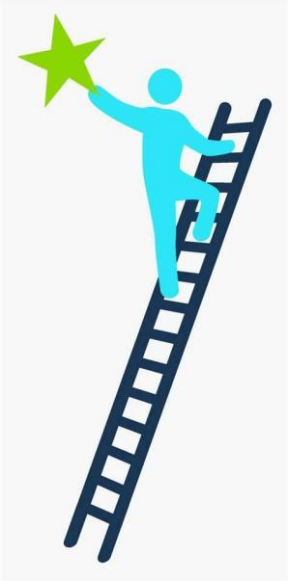
Course Objectives

- The course is designed to give students basic concepts of biochemistry and its nature of interdisciplinary importance. To let students understand the physical and chemical properties of molecules, and their status of occurrence in the biological system.
- To familiarize the students with major bio-molecules namely carbohydrates, lipids, proteins and nucleic acids which are important for the structural organization and functions of the cells. The course encompasses the overall perspective on the biomolecules, their characteristic properties and organization in carrying out all the living functions which constitute life.
- The course is designed to enable students to understand enzymes, properties, mechanism of action and regulation of their activity. To acquaint students grasp the basic cascades of the energy transfer system and subsequent products in biology. The course will help the students understand fundamental energetics of biochemical processes, their functionalities.
- This course aims to develop a thorough knowledge among the students about metabolism. To enable students to visualize energy production and utilization in biological processes. The course gives metabolism of different biomolecules that can help students in understanding chemical pathway living systems.

The course is designed to train the students in bio-instrumentation techniques essential for the understanding of life sciences and biotechnology. It is designed to make students get an idea on the design of experiments using biophysical techniques. To make aware students giving the indispensability importance of modern techniques in biophysical research and living.

Attendance Requirement & Internal Assessment Criteria

The institution follows the regulations for examinations of the UHS in letter and spirit. The students require **85% attendance** in all academic sessions and **50% marks** in internal assessments and send-up examinations to be eligible for the UHS Professional Examinations.



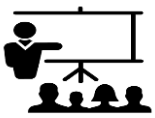
Learning Resources & Pedagogy

Book Recommendations



Sr.	Book Name	Author	Edition
1.	Lippincott Illustrated Reviews	Wolters Klower	8th
2.	Harper's Illustrated biochemistry	Victor W.Rodwel	32nd
3.	Textbook of medical biochemistry	MN chatterjea	8th
4.	Medical Biochemistry	Mushtaq Ahmad	10th

Traditional & Innovative Teaching Methodologies



Sr.	Pedagogical Methodologies	Description
1.	Lectures	Traditional method where an instructor presents information to a large group of students (large group teaching). This approach focuses on delivering theoretical knowledge and foundational concepts. It is very effective for introducing new topics.
2.	Tutorial	Tutorials involve small group discussion (SGD) where students receive focused instruction and guidance on specific topics.
	Demonstrations	Demonstrations are practical displays of techniques or procedures, often used to illustrate complex concepts or practices, particularly useful in dental education for showing clinical skills.
3.	Practicals	The Laboratory is equipped with the state of the art instruments like Microlab, ELIZA, Electrophoresis and pH metry to enable the students in the aspects of performing all the basic biochemical tests as prescribed by the UHS course. Moreover, the Hospital is equipped with the latest Thermal cyclers to show the students how to perform PCR. Hands-on sessions where students apply theoretical knowledge to real-world tasks. This might include lab work, clinical procedures, or simulations.

		Practicals are crucial for developing technical skills and understanding the application of concepts in practice.
4.	Student Presentations	Students prepare and deliver presentations on assigned topics. This method enhances communication skills, encourages students to explore topics in-depth. It also provides opportunities for peer feedback and discussion.
5.	Assignment	Tasks given to students to complete outside of class. Assignments can include research papers, case studies, or practical reports. They are designed to reinforce learning, assess understanding, and develop critical thinking and problem-solving skills.
7.	Self-directed Learning	Students take initiative and responsibility for their own learning process. Students are encouraged to seek resources, set goals, and evaluate their progress. This is a learner-centered approach where students take the initiative to plan, execute, and assess their own learning activities. This method promotes independence, critical thinking, and lifelong learning skills.
8.	Flipped Classroom	In this model, students first engage with learning materials at home (e.g., through videos, readings) and then use class time for interactive activities, discussions, or problem-solving exercises. This approach aims to maximize in-class engagement and application of knowledge.
9.	Peer-Assisted Learning (PAL)	A collaborative learning approach where students help each other understand course material. PAL involves structured peer tutoring, study groups, or collaborative tasks. It enhances comprehension through teaching, reinforces learning, and builds teamwork skills.
10.	Team-based Learning (TBL)	A structured form of small group learning where students work in teams on application-based tasks and problems. Teams are responsible for achieving learning objectives through collaborative efforts, promoting accountability, and deeper understanding of the material.
11.	Problem-based Learning (PBL)	Students work on complex, real-world problems without predefined solutions. They research, discuss, and apply knowledge to develop solutions. PBL fosters critical thinking, problem-solving skills, and the ability to integrate knowledge from various disciplines.
12.	Academic Portfolios	A collection of student's work that showcases learning achievements, reflections, and progress over time. Portfolios include assignments, projects, and self-assessments. They provide a comprehensive view of student development, highlight strengths and areas for improvement, and support reflective learning (experiential learning)



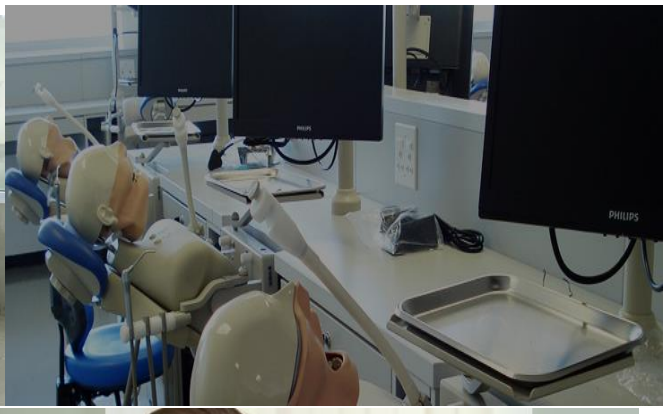
Flipped Classroom

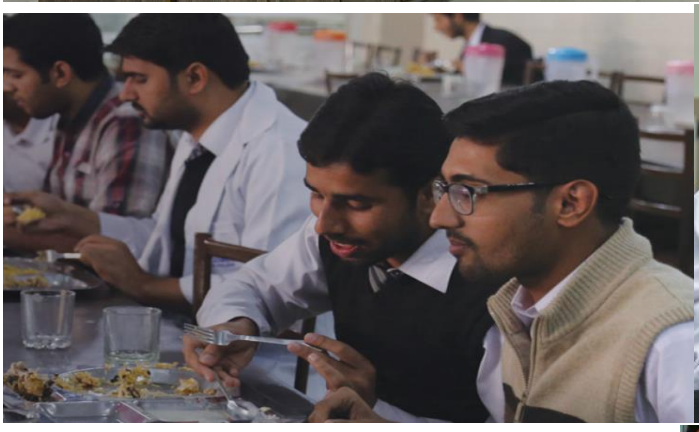
Infrastructure Resources

Sr.	Infrastructure Resources	Description
1.	Lecture Hall	Each year has a dedicated lecture hall, totaling four lecture halls for the four professional years. These halls are equipped with modern audiovisual aids to support effective teaching and learning.
2.	Tutorial Room	The college's tutorial rooms, each with a capacity of 30, are specifically designed to support small group discussions and interactive sessions. These rooms facilitate personalized instruction, enabling more engaged and effective learning through direct interaction between students and instructors.
3.	Lab	The college is equipped with state-of-the-art laboratories for practical and clinical work. Each lab is designed to support various disciplines, to facilitate hands-on learning.
4.	Library on campus	A huge library occupies full floor has 260 seats including study carrels and group-discussion tables. Latest reference books, of Basic and Clinical Sciences along with national & international journals are available in the library.
5.	Digital Library	The digital library offers access to a vast collection of e-books, online journals, research databases, and other digital resources. It supports remote access and provides tools for academic research and learning.
6.	Learning Management System (LMS)	The LMS is a comprehensive online platform that supports course management, content delivery, student assessment, and communication. It provides tools for tracking progress, managing assignments, and facilitates ongoing academic activities.
6.	Phantom Labs	Specialized Phantom Labs are available for advanced simulation and practice in dental procedures. These labs provide high-fidelity models and simulators that help students refine their clinical skills in a controlled environment.
7.	Mess & Cafeteria	The College has its own on-campus Mess which caters to 600 students. All food items including dairy, meat, and vegetables are

		sourced organically and bought in at the time of cooking, in order to ensure that students get freshly cooked meals at all times Students form the Mess committee which decides the mess menu in consultation with other students. The Mess offers fresh food to all residents three times a day. However, day scholars are also welcome to use the Mess facility at a reasonable cost. Two 50- inch LCD screens provide students an opportunity to get entertained during their meal times.
8.	Gymnasium & Sports	We recognize sports as a pivotal key to shape and maintain students' personality and good health. The College has indoor and outdoor sports facilities to help enhance the cognition and capacity to learn. There is a proper sports section for various games like basketball, football, volleyball, and cricket. The gym itself is fully equipped with modern machinery both for students and faculty.
9.	IT Lab	The IT Lab is equipped with modern computers and software available for students who need access for academic purposes.
10.	Auditorium	The college has a spacious auditorium equipped with advanced audio-visual facilities. It is used for large-scale lectures, guest presentations, and academic conferences, providing a venue for students to engage with experts and participate in important educational events.
11.	Examination Halls	The college provides dedicated examination halls that are designed to accommodate a large number of students comfortably. These halls are equipped with necessary facilities to ensure a smooth and secure examination process, including proper seating arrangements, monitoring systems, and accessibility features.




PHILIPS





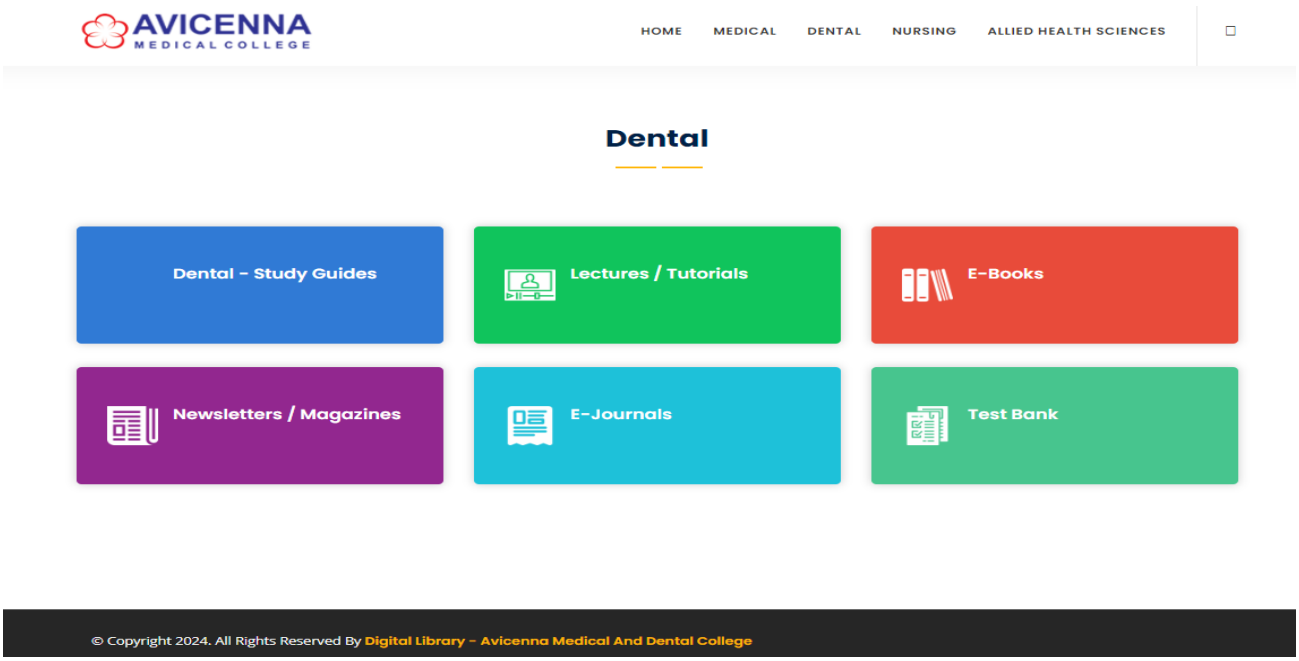




Digital Library & Learning Management System (LMS)

1. The COVID-19 pandemic highlighted the necessity of interactive online teaching for better retention of topics by students. Strategies like online learning management system (LMS), online discussions, online quizzes, assignment design, and flipped learning enhance student engagement in online education when needed.

2. Avicenna Medical & Dental College lays emphasis on the provision of learning material and online video lectures, video tutorials in the e-library and learning resource center, which has a dedicated website of Avicenna Medical College to enable the students to develop concepts and clarify their doubts, if they have not been able to do so in the teaching sessions during college hours. The digital library can be approached on http://digital.avicennamch.com/.

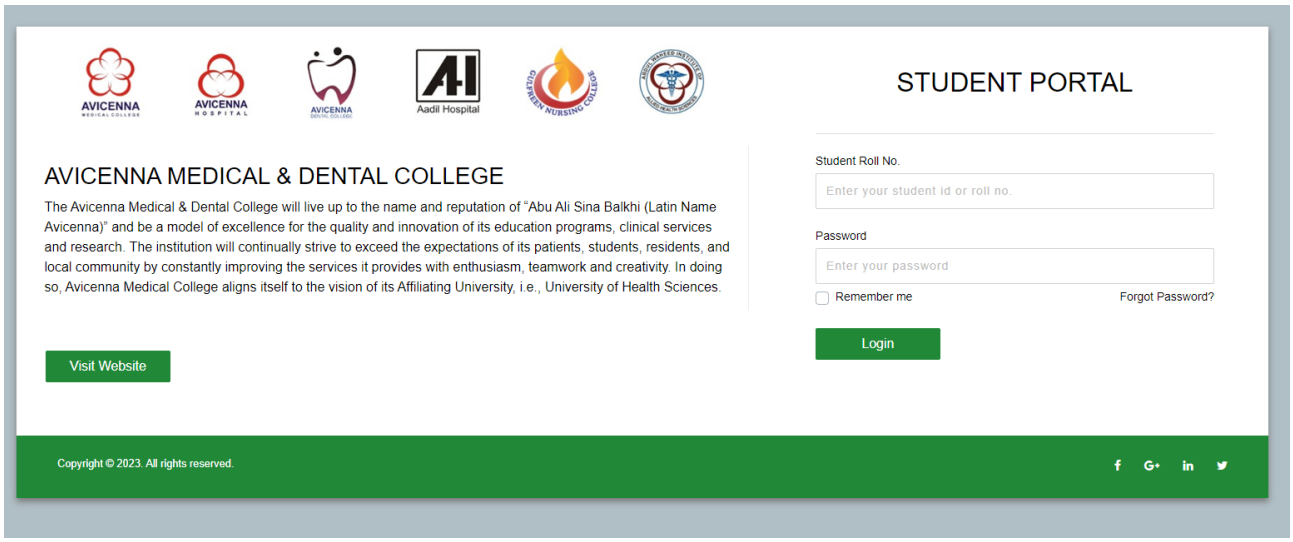


3. The institution has also endeavored to link itself with the digital libraries and e-library of the University of Health Science (UHS) and Higher Education Commission (HEC) to enable the students to benefit from the valuable resource material, lectures and knowledge bank at these sites. The links are available with the HEC http://www.digitallibrary.edu.pk/ and learning management system of UHS http://lms.uhs.edu.pk .

4. The Learning Management System (LMS) at Avicenna Medical & Dental College is a comprehensive platform managed by the Department of Student Affairs. It is designed to facilitate effective communication and information exchange between students, parents, faculty, and administrative staff. The LMS portals are specifically tailored to meet the needs of the following stakeholders:

   a. **Students**: For academic resources and scheduling.
   b. **Parents:** For monitoring academic progress and other relevant information.
   c. **Faculty:** For managing course content and academic activities.

d. **Department of Student Affairs:** For overseeing administrative functions.
e. **Department of Medical/Dental Education:** For overseeing academic functions.



5. Students can access a comprehensive range of academic resources and information through the student portal. By logging in with their roll number and password, students can:

- Look at their attendance and results.
- Review academic activities and weekly timetables/schedules.
- Access rotation planners and test schedules.
- Check for any notification, assignment or resource material from their teachers.

6. The information to the parent is duplicated by the issuance of the password and login to the Students Learning Management System which is dedicated to the Academic Program of the students. The parents can view the following by logging in to the mobile app of Avicenna Student Management System:

a) Syllabus
b) Table of specifications
c) Annual Planner
d) Synopsis
e) Block Time Table
f) Weekly training program
g) Allocation of Marks
h) Assessment calendar
i) Results of tests / exams*
j) Students' attendance record
k) Fees & fines

Assessment Guidelines

Assessment in dental education is a critical component designed to ensure that dental students acquire the necessary knowledge, skills, and competencies required for effective dental practice.

Assessment drives learning! – George E. Millar

You will encounter a variety of assessment methods, each serving a specific purpose.

- Written examinations, including multiple-choice and essay questions, will test your grasp of theoretical concepts and subject matter.
- Practical assessments will require you to demonstrate your clinical skills and ability to apply knowledge in real-world scenarios.
- Oral exams will evaluate your communication skills and reasoning abilities through case discussions and problem-solving exercises.
- Clinical skills and work-place based assessments will observe your hands-on proficiency and patient management capabilities.

At Avicenna Medical & Dental College, internal assessments are systematically conducted throughout each academic year of the BDS program, as per the guidelines established by the University of Health Sciences (UHS). These assessments, overseen by the Assessment Cell, adhere to either the Annual Subject-Based System or the Integrated/Modular System, depending on the curriculum structure.

Notably, beginning with the 2024-25 academic year, the weightage of internal assessments will be increased from 10% to 20%. The UHS administers professional examinations independently, organizing them at designated neutral sites and appointing external examiners to ensure objectivity and fairness.

Internal Assessment Weightage	10%	100 %
External Assessment Weightage	90%	



Internal Assessment Criteria

Internal Assessment	Assessment Methods	Percentage Weightage
Grand Tests	20 MCQs (01 mark each) 10 SEQs (03 marks each) Viva (25 marks) OSPE (20 marks)	30%
Early Session Exam	21 MCQs (01 mark each) 8 SEQs (03 marks each) Viva (25 marks) OSPE (20 marks)	70%
Mid Session Exam	21 MCQs (01 mark each) 8 SEQs (03 marks each) Viva (25 marks) OSPE (20 marks)	
Send-up Exam	21 MCQs (01 mark each) 8 SEQs (03 marks each) Viva (25 marks) OSPE (20 marks)	100%
Total		200%

Reference attached on next page.

Avicenna Dental College

Examination Marks Scheme 2023-2024

1st Year BDS

Form No	BDS-1 Form-1		BDS-1 Form-2		BDS-1 Form-3		BDS-1 Form-4		BDS-1 Form-5		BDS-1 Form-6	
Test Type	Grand Test /Substage /Stage				Revision Test		Session Exam				Send Up	
Mode of Exam	Theory		Practical		Theory		Theory		Practical		Theory	
Weightage	(1,2)* 30%				0%		(3,4)* 70%				100%	
Anatomy 200 /Substage /Stage	MCQ 55, SEQ 45	100	Viva 25, OSPE 25	50	MCQ 20, SEQ 30	50	MCQ 45, SEQ 45, IA 10	100	Viva 45, OSPE 45, IA 10	100	MCQ 45, SEQ 45, IA 10	100
Physiology 200	MCQ 55, SEQ 45	100	Viva 25, OSPE 25	50	MCQ 20, SEQ 30	50	MCQ 45, SEQ 45, IA 10	100	Viva 35, OSPE 55, IA 10	100	MCQ 45, SEQ 45, IA 10	100
Biochemistry 100	MCQ 55, SEQ 45	100	Viva 25, OSPE 25	50	MCQ 20, SEQ 30	50	MCQ 21, SEQ 24, IA 05	50	Viva 25, Ospe 20, IA 05	50	MCQ 21, SEQ 24, IA 05	50
Oral Biology 200	MCQ 55, SEQ 45	100	Viva 25, OSPE 25	50	MCQ 20, SEQ 30	50	MCQ 45, SEQ 45, IA 10	100	Viva 60, OSPE 30, IA 10	100	MCQ 45, SEQ 45, IA 10	100

NOTE 1 : *If Viva/OSPE is held along with Theory test , The Theory test will get 15% weightage & VIVA / OSPE will get 15% Weightage in Grand Test

NOTE 2 : *If Viva/OSPE is not held for any reason Theory test will get full 30% weightage in Grand Test

NOTE 3 : *If Viva/OSPE is held along with Theory test , The Theory test will get 35% weightage & VIVA / OSPE will get 35% Weightage in Session Exam

NOTE 4 : * If Viva/OSPE is not held for any reason Theory test will get full 70% weightage in Session Exam

8/3/24

Department of Anatomy	Department of Biochemistry	Department of Physiology	Department of Oral Biology

Head of Examination Cell : Ijlal Zehra Zaidi

Chairman Avicenna:

Prof. Dr. Ijlal Zehra Zaidi
Head of Examination Department
Avicenna Medical & Dental College

14/3.

External Assessment

External Assessment	Assessment Methods	Marks	Percentage Weightage
Theory · Total marks · Time	21 MCQs (01 mark each) 8 SEQs (03 marks each)	21 24	45 %
Practical · Total marks · Time	Viva Voce O.S.P.E.	25 20	45 %
Internal Assessment		10	10 %
Total marks		100 Marks	100%

Sample Paper

Stem:

A 16 year old boy reported to the doctor with complaints of headache and being overweight. He has severe obesity. His blood pressure at the time of visit was 140/90 mmHg. Laboratory investigations revealed increased blood sugar and deranged lipid profile.

Lead in statement:

Orlistat was prescribed. It inhibits which of the following enzymes to decrease fat absorption and lose weight?

Option:

a) Pancreatic lipase*
b)Lingual Lipase
c)Trypsin
d) Pancraetic Amylase

COGNITIVE LEVEL: Recall/ Application

DIFFICULTY LEVEL: Hard/Moderate/Easy

IMPORTANCE: Must Know/Need to Know/Nice to Know

REFERENCE: Lippincott 8th edition

SEQ/SAQ

A 48-year-woman with a long history of obesity, diabetes, and dyslipidemia presented to the hospital emergency department with a 5-day history of weakness, fever, productive cough, nausea, and vomiting. Urinalysis revealed 4+ glucose and 3+ ketones. Chemistry panel revealed a glucose of 420 mg/dl,arterial blood gas with pH of 7.12, pCO2 of 17 mmHg, and bicarbonate of 5.6 mEq/l.

Questions	Marks
a)Name ketone bodies	01
b) Discuss their formation in the human body.	02

Key	Marks
a) The compounds categorized as ketone bodies are acetoacetate, 3-hydroxybutyrate (also called β-hydroxybutyrate), and acetone	1
b) • During a fast, the liver is flooded with fatty acids mobilized from adipose tissue.The resulting elevated hepatic acetyl CoA activates pyruvate carboxylase. OAA thus produced is used by the liver for gluconeogenesis rather than for the TCA cycle. Therefore, acetyl CoA is channeled into ketone body synthesis. • Fatty acid oxidation decreases the NAD+ to NADH ratio, and the rise in NADH shifts OAA to malate. This pushes acetyl CoA away from gluconeogenesis and into ketogenesis	2

COGNITIVE LEVEL: **Recall/** Application

DIFFICULTY LEVEL: Hard/**Moderate**/Easy

IMPORTANCE: Must Know/**Need to Know**/Nice to Know

REFERENCE: **Lippincott 8th edition**

OSPE

key: : **Test for ketone bodies: Rothera's Test**

Ketonuria :

1- Common in uncontrolled DM.
2- Ketonurea present in:
   - Disease (DM)
   - Starvation
   - Vomiting for long time
3- Values :
   - Negative test result is normal.
   - Small: < 20 mg/dl
   - Moderate: 30-40 mg/dl
   - large > 80 mg/dl

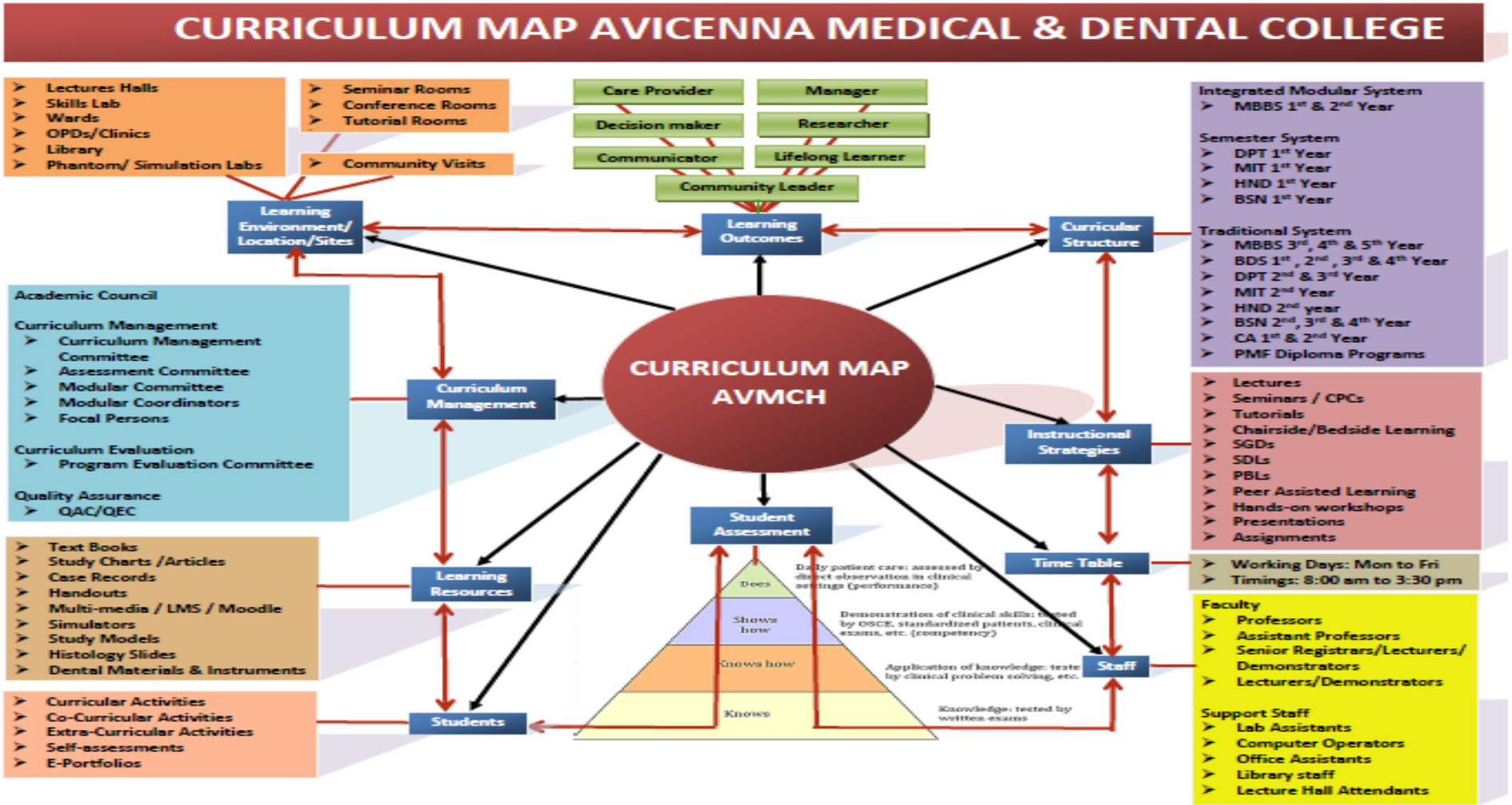
CURRICULUM DETAILS

Curricular Framework including Allocation of Hours (PMDC)

BDS SCHEME OF STUDIES			
Basic Dental Sciences / Preclinical Year		**Clinical Dental Sciences / Clinical Years**	
1st Professional Year	**2nd Professional Year**	**3rd Professional Year**	**4th Professional Year**
Anatomy 300 Hours	**General Pathology** 220 Hours	**General Medicine** 180 Hours	**Operative Dentistry** 250 Hours
Physiology 300 Hours	**Pharmacology** 220 Hours	**General Surgery** 170 Hours	**Prosthodontics** 250 Hours
Biochemistry 180 Hours	**Science of Dental Materials** 300 Hours	**Oral Pathology** 180 Hours	**Orthodontics** 250 Hours
Oral biology & Tooth Morphology 300 Hours	**Community Dentistry** 200 Hours	**Oral Medicine** 150 Hours	**Oral & Maxillofacial Surgery** 250 Hours
General Education 120 Hours (Islamiat, Pakistan Studies Behavioural Sciences, Research, English, Arts & Humanities)	**Pre-clinical Operative Dentistry** 80 Hours	**Periodontology** 180 Hours	**Paediatric Dentistry** 100 Hours
	Pre-clinical Prosthodontics 80 Hours	**Clinical Operative** 80 Hours	**General Education** 100 Hours (Research, English, Arts & Humanities, ICT)
	General Education 100 Hours (Behavioural Sciences, Research, English, Arts & Humanities, ICT)	**Clinical Prosthodontics** 80 Hours	
		Clinical Oral & Maxillofacial Surgery 80 Hours	
		General Education 100 Hours (Research, English, Arts & Humanities, ICT)	
1200 hours	**1200 hours**	**1200 hours**	**1200 hours**

Curricular Map & Rationale

1. This pictorial, vertical and horizontal presentation of the course content and extent shows the sequence in which various systems are to be covered. Curricular map to cover all the subjects and modules and the time allocated to study of the systems for the undergraduate programs offered at four colleges at campus are as follows:



Rationale 1st Professional Year	
Subjects	**1.4 Biochemistry**
TERM- I	● Cell ● Acid base balance and body fluids ● carbohydrates, ● Proteins & Hemoglobin ● Lipid chemistry ● Enzymes
TERM- II	● Nucleotide Chemistry & Metabolism ● Carbohydrate Metabolism ● Protein Metabolism ● Lipid Metabolism
TERM-III	● Vitamins, ● Minerals, ● Nutrition, ● Bioenergetics ● Genetics & Biochemical Techniques

Learning Outcomes & Table of Specification

Unit/ Chapter	Topic/ Content	Student Learning Outcomes	Mode of Information (MOIT)	Learning Domain (KSA-Model)	Assessment Method (No. of Questions)			
					MCQS	SEQs	Viva	OSCE/OSPE or Practical

Unit 1	Biochemistry of Body Fluids, Cell	By the end of this topic, students will be able to: At the end of the session, students will be able to: 1. Introduction of water & weak acid & bases 2. Concept of pH & pH scale. 3. Dissociation constant & titration curve of weak acids. 4. discusss the concept of pK values. 5. Buffers their mechanism of action. 6. Regulation of pH of body fluids, concept of Acidosis/Alkalosis. 7. Routes of transport across cell membrane 8. Cell membrane 9. Organelles	Lecture/Tutorial/ Practical/ Demonstration	Knowledge (Cognitive) or Skill (Pscyhomotor)/ or Attitude (Effective) (C1)	3 MCQs	1 SEQ	Viva (+)	

Unit 2	Chemistry & metabolism of Carbohydrates	By the end of this topic, students will be able to: At the end of the session, students will be able to: 1: Classification, biochemical functions & significance. 2: Structure & functions of Monosaccharides, diasaccharides& polysaccharides, their important examples & biochemical role.. 3: Citric acid cycle, 4: Oxidation of pyruvate, Glycolysis 5: Metabolism of Glycogen 6: Definne& elaborate gluconeogenesis, 7: Define Pentose phosphate pathway with reactions. 8. Reulation of carbohydrates metabolism	Lectures, Tutorial, Small groups discussions, presentations	C1 &C2	2 MCQs	1 SEQ	Viva (+)	

Unit 3	Chemistry & metabolism Of Lipids	By the end of this topic, students will be able to: At the end of the session, students will be able to: 1: Define & Classify Lipids with their biological functions. 2: Define & Classify fatty acids along with their properties. 3: Define Nutritionally essential fatty acids and their functions. 4: Briefly discuss the eicosanoids & their biologic functions. 5. Explain the structure & biological role of Cholesterol. 6. Oxidation & biosynthesis of fatty acids. 7. Metabolism of Unsaturated fatty acid &Ecosanoids 8. Metabolism of acylglycerol&Sphingolipids. 9. Lipids transport & storage (Lipoproteins metabolism) 10. Cholesterol biosynthesis transport & excretion. 11. Regulation of lipids metabolism.	Lectures, Tutorial, Small groups discussions, presentations	C1	01 MCQ	01 SEQ	Viva	

Unit 4	Chemistry of Amino-acids and Proteins	At the end of the session, students will be able to: 1: Define & classify the Amino acids along with examples. 2: Differentiate between standard and non-standard amino acids. 3: Briefly discussed the functions of Amino acids. 4. Importance of amino acids in maintenance of pH. 5. Peptides their biochemical significance & structure. 5. Define & Classify Proteins along with their biomedical functions, Properties and structure of proteins. 6. Globular & fibrous proteins. 7. Briefly discuss the denaturation of proteins 8. Define Immunoglobulin their types, structure & biological impotance. 9. Define Plasma proteins their types & biomedical importance. 10. Briefly discuss the important Techniques for separation of proteins. 11.Explain the structure & functions of Hemoglobin & myoglobin & types of Hemoglobin. 12. Explain the oxygen binding capacity of hemoglobin.	Lectures, Tutorial, Small groups discussions, presentations	C1 & C2	2 MCQs	1 SEQ		

		13. Define Hemoglobinopathies; Sickle cell anemia & Thalassemia.						

Unit 5	Metabolism of Amino acids & Proteins:	At the end of the session, students will be able to: 1: Discuss the biosynthesis of amino acids. 2: Urea Cycle 3: Catabolism of Amino acids 4: Porphyrins& bile pigments.	Lectures, Tutorial, Small groups discussions, presentations	C1	01 MCQ	01 SEQ	Viva	

Unit 6	Biochemical Techniques	At the end of the session, students will be able to: To study biochemical Techniques; Includes principle, procedure, instrumentation & interpretations. • Centrifugation • Ultracentrifugation • Enzyme-linked immunosorbent assay (ELISA) • Radioimmunoassay • Chromatography • Electrophoresis • pH metery • Spectrophotometry	Lectures, Tutorial, Small groups discussions, presentations	C1 & C2	01 MCQ	01 SEQ	Viva	

Unit 7	Enzymes	At the end of the session, students will be able to: 1: Define, introduce & classify the enzymes along with their properties. 2: Define coenzymes & cofactors & classify them. 3. Briefly explain the mechanism if enzyme action and kinetics of enzymes. 4. Discuss the factors affecting the enzyme activity. 5. Define enzyme inhibition , classify them into their types with examples. 6. Line weaver burk equation & their applications in enzymes kinetics. 7. Define isoenzymes& their clinical significance. 8. Briefly explain the regulation of enzyme activity. 9. Briefly explain the diagnostic importance of enzymes in diseases. (Clinical enzymology). 10. Discuss the therapeutic uses of enzymes	Lectures, Tutorial, Small groups discussions, presentations	C1 & C2	4MCQ	1 SEQ		

Unit 7	Endocrines:	At the end of the session, students will be able to: 1: Overview of endocrine system, classification of hormones . 2: Pituitary & Hypothalamic hormones;Structure, transport, synthesis secretion regulation catabolism & biological action.. 3. Briefly explain the Thyroid hormones; Structure, transport, synthesis secretion regulation catabolism & biological action. 5: Briefly explain the Calcium regulating hormones;Structure, transport, synthesis secretion regulation catabolism & biological action. 6. Briefly explain the Adrenal cortical hormones; Structure, transport, synthesis secretion regulation catabolism & biological action. 7. Briefly explain the Adrenal medullary; Structure, transport, synthesis secretion regulation catabolism & biological action of all adrenal medullary hormones.	Lectures, Tutorial, Small groups discussions, presentations	C1		2 MCQ	0 SEQ	

		8. Briefly explain the Male & female Gonadal hormones ;Structure, transport, synthesis secretion regulation catabolism & biological action.						

Unit 8	Bilirubin	At the end of the session, students will be able to: 1. Discuss the Chemistry & biosynthesis of heme& other porphyrins including disorders of hemebiosnthesis. (porphyrias) 2.Explain the bilirubin metabolism.	Lectures, Tutorial, Small groups discussions, presentations	C1	01 MCQ	0 SEQ		

Unit 9	Nucleotides& Nucleic acid/ Genetics:	At the end of the session, students will be able to: 1. Discuss the Chemistry & structure of nucleotides & their biochemical role. 2. Synthesis & degradation of purines &pyrimidines; • DNA structure & synthesis • RNA structure & synthesis. • Protein synthesis & genetic code. • Recombinant DNA technology • Regulation of gene expression & molecular basis of genetic diseases.	Lectures, Tutorial, Small groups discussions, presentations	C1	01 MCQ	0 SEQ		

Unit 10	Vitamins & Minerals	At the end of session students will be able to know Sources, Recommended Dietary Allowance (RDA), biochemical functions, deficiency, and toxicity of Vitamins and Minerals	Lectures, Tutorial, Small groups discussions, presentations	C1	3 MCQs	01 SEQ		
Total					21	8		


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