

DENTAL MATERIALS STUDY GUIDE

SECOND YEAR BDS

2023

DEPARTMENT OF DENTAL MATERIALS

**DEPARTMENTAL ORGANOGRAM/HIERARCHY**

HEAD OF THE DEPARTMENT

Prof. Dr. Usman Mahmood

Associate Professor

 Dr Omair Anjum

Dr.Omair Anjum

Assistant Professor

Dr. Fatima Suhaib

Demonstrator

Dr. Fatima Liaqat

Demonstrator

Dr. Maida Iqbal

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# 1. INTRODUCTION

# The study guide has been prepared for facilitation of 2nd Year BDS students regarding the curriculum of dental materials

# 2. STUDY GUIDE OBJECTIVES

The guide will prepare the students by giving them all the necessary information and guidance regarding the subject and course work.

# 3. UHS SYLLABUS, ToS, EXAMINATION RULES AND REGULATIONS

**Course duration:**

* + 36 weeks per academic year
	+ 1.5 hours lecture per week for 36 weeks ( 54 hrs)
	+ 2.5 hours practical for 36 weeks (90 hrs)
	+ Two hours tutorials/interactive group discussion classes per week (72 hrs)
	+ Presentation session at the end of academic year in Preclinical classes (16 hrs)
	+ Total teaching hours for the subject of dental materials (232 hrs)

# Teaching objectives:

# To teach the students the physical, mechanical, chemical & biological properties of all materials used in conventional & modern dentistry.

# To teach the student an understanding of properties and handling of materials as essential for both clinical and laboratory settings.

# To equip the students of the composition, manipulative techniques, application of dental materials and their interaction with the oral environment.

# To teach the students the scientific background and the clinical skills required to handle modern dental materials.

# To enable students to practice the manipulative techniques before their application in the clinical setup.

# To undertake practical classes that would teach the students the manipulation and clinical handling of modern dental materials.

* Developing skills as a self-directed learner, recognizing continuing educational needs; use appropriate learning resources and critically analyze relevant literature in order to have a comprehensive understanding and knowledge of Dental Materials.

# UHS Course contents

* Define characteristics associated with the physical and chemical properties of matter, explain and compare matter to energy.
* Understand the properties of dental materials including; Mechanical, Thermal, electrical, corrosive, solubility, flow, adhesion, wetting, viscosity, retention, curing, and composition.
* Explain the uses of amalgam in dentistry. Perform proper mixing of Amalgam
* List the chemical components of amalgam alloy and explain the effects of each component on the final amalgam mix.
* List the chemical components in the powder and the liquid of zinc phosphate cement and explain the effects on a mix if the composition is altered.
* Explain the uses of zinc phosphate cement and compare the differences in technique in preparing each.
* Perform mixing of zinc phosphate cement according to its use and explain the effect of variations in technique on the properties: consistency, setting time, strength, solubility, and dimensional change.
* Describe use of a glass ionomer cement and list the components.
* Perform mixing of glass ionomer and explain the effect of variations in technique on the following properties: consistency of the mix, setting time of the mix, strength of set material, optical properties of mix and set material, and solubility of the set material.
* List the uses of zinc oxide-eugenol cements and compare the differences in technique in preparing each.
* List the uses of resin cements and bonding agents and the differences preparing each.
* List the chemical components in a resin cement.
* List the esthetic filling materials and explain and compare the differences and/or similarities of the technique used in their preparation.
* Perform mixing or preparation of any esthetic filling material according to its use and explain the effect of variation in technique on the following properties: consistency of mix, setting time of mix, compressive strength of set material, solubility of the set material.
* List the types of gypsum products and compare their uses and origins.
* Explain the effects of variations in the water: powder ratio, spatulation, chemical additives and insert fillers on the following properties of gypsum products: setting times, setting expansion, strength and hardness and produce an acceptable study cast.
* Identify the following impression materials: agar (reversible hydrocolloid), poly vinyl siloxane, alginate (irreversible hydrocolloid), polyether, and rubber base and be able to categorize them into: rigid impression materials, plastic impression materials, elastic impression materials, or rubber impression materials.
* Classify resin materials according to heat cured resins and self-curing resins.
* Name the main component of reversible hydrocolloid material and the derivation of this material.
* Describe the manipulation of reversible hydrocolloid material, explain the effects of variations in technique on the following properties: viscosity of the sol, gelation temperature, ability to reproduce detail, strength, set or resistance to deformation and dimensional stability.

# Table of specifications for Dental Materials Theory Examination 2nd Year BDS

**TABLE OF SPECIFICATIONS (TOS)**

|  |  |  |  |
| --- | --- | --- | --- |
| Sr | Contents | SEQs | MCQs |
| **1** | Physical properties of Dental Materials/ Thermal Properties | 1 | 2 |
| Mechanical Properties of Dental Materials |
| **2** | Impression Materials | 1 | 5 |
| **3** | Gypsum Products | 1 | 2 |
| **4**  | Dental Waxes | 1 | 1 |
| **5** | Casting Investments | 1 | 2 |
| **6** | Abrasive and Polishing Materials | 1 | 2 |
| **7** | Polymers / Denture Base Resins | 1 | 3 |
| **8** | Dental Ceramics | 1 | 4 |
| **9** | Adhesion / Bonding | 1 | 4 |
| Restorative Resins / Composites |
| **10** | Dental Cements | 1 | 4 |
| **11** | Glass ionomers | 1 | 4 |
| **12** | Dental Amalgams | 1 | 3 |
| **13** | Direct Filling Gold | 1 | 1 |
| **14** | Casting Alloys | 1 | 4 |
| **15** | Soldering / Welding | 1 | 4 |
| Wrought Alloys |
| Dental Implant Materials |
|  | **TOTAL** | **15** | **45** |

# Table of specifications for Dental Materials oral & practical 2nd Professional examination

Oral and Practical Examination carries 200 marks

|  |  |
| --- | --- |
| **Examination Component** | **Marks** |
| A- Internal Assessment | 20 |
| B- Theory* SEQs: 15 (03 marks each)
* MCQs: 45 (01 marks each)
 | 90 |
| C- Viva voce1. External examiner: 25 Marks
2. Internal Examiner: 25 Marks
 | 50 |
| D- OSPE1. Observed stations: There are 5 observed

stations; 5 marks for each station – Manipulation and mixing of materials will observed station)1. Non-observed stations: There are five non-observed stations; 3 marks for each station – time allowed is 2 minutes for each

non-observed station | 40 |

**Evaluation and Feedback**

**Internal Assessment (20 Marks)**

Based on written tests (60%), OSPE and Viva (30%) and Assignments (10%).

**Written Tests** will be conducted at the end of each course. Tests will comprise of Multiple Choice Question (MCQs) and Short Essay-type Questions (SEQs).

**Practical Sessions** will be conducted after each topic.

**Teaching Assignments** for students for each topic.

**Viva and Objective Structured Practical Examination (OSPE):** 30 Marks

**Send-up Examination:** 2 Hours 15 minutes’ duration. UHS Pattern examination. (MCQs and SEQs), Viva-voce

**Professional Examination by the UHS:** 200 Marks

Theory 90 Marks (15 SEQs 03 Marks each, 45 MCQs 01 mark each),

Viva-voce and OSPE: 90 Marks

Internal Assessment 20 Marks

**Format for OSPE BDS Dental Materials**

Marks will be divided as per the following formula:

Structured Viva-Voce 50 Marks

 25 with Internal &

 25 with External Examiner

OSPE -- 10 Stations 40 Marks (02 minutes each)

**4. ACADEMIC CALENDAR**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr no** | **Date** | **Topic** | **Faculty** |
|  | 01/03/2023 | Lecture: Introduction to Dental Material | Dr.Usman Mahmood |
|  | Tutorial | Dr.Fatima Suhaib |
|  | 02/03/2023 | Physical Properties (Thermal Properties) | Dr.Usman Mahmood |
|  | 03/03/2023 | Physical Properties (Electro chemical Properties) | Dr.Usman Mahmood |
|  | 8th - 10thMARCH | **SPORTS DAY** |  |
|  | 15/03/2023 | Mechanical Properties | Dr.Omair Anjum |
|  | Tutorial | Dr.Fatima Suhaib |
|  | 16/03/2023 | Mechanical Properties | Dr.Omair Anjum |
|  | 17/03/2023 | Mechanical Properties | Dr.Omair Anjum |
|  | 22/03/2023 | Mechanical Properties | Dr. Omair Anjum |
|  | 23/03/2023 | **PAKISTAN DAY**  |  |
|  | 24/03/2023 | Introduction to Impression Materials | Dr.Usman Mahmood |
|  | Tutorial |
|  | 29/03/2023 | Non-elastic Impression Material | Dr.Usman Mahmood |
|  | 30/03/2023 | Impression Compound | Dr.Usman Mahmood |
|  | 31/03/2023 | Elastomeric/Impression Material | Dr.Usman Mahmood |
|  | 05/04/2023 | Polymeric Materials | Dr.Usman Mahmood |
|  | Tutorial | Dr.Fatima Suhaib |
|  | 06/04/2023 | Hydrocolloids | Dr.Usman Mahmood |
|  | 07/04/2023 | Practical: Impression Compound | Dr.Fatima Suhaib |
|  | 12/04/2023 | Disinfection of Impressions | Dr.Fatima Suhaib |
|  | Tutorial |
|  | 13/04/2023 | Biocompatibility | Dr.Fatima Suhaib |
|  | 14/04/2023 | Biocompatibility | Dr.Fatima Suhaib |
|  | 19/04/2023 | Gypsum | Dr.Omair Anjum |
|  | Tutorial | Dr.Fatima Suhaib |
|  | 20/04/2023 | Gypsum | Dr.Omair Anjum |
|  | 21/04/2023 | EID UL FITR | Dr.Fatima Suhaib |
|  | 26/04/2023 | TEST 1: IMPRESSION MATERIALS | Dr.Usman Mahmood |
|  | 27/04/2023 | Revision Assignment: Impression Material | Dr.Usman Mahmood |
|  | 28/04/2023 | Practical: Impression Material (Alginate Mixing) | Dr.Omair Anjum |
|  | 03/05/2023 | Introduction to Dental Composites | Dr.Usman Mahmood |
|  | Tutorial | Dr.Fatima Suhaib |
|  | 04/05/2023 | Dental Composites: composition | Dr.Usman Mahmood |
|  | 05/05/2023 | Dental Composites: Classification | Dr.Usman Mahmood |
|  | 10/05/2023 | Dental Composites: Properties | Dr.Usman Mahmood |
|  | Tutorial | Dr.Fatima Suhaib |
|  | 11/05/2023 | Dental Composites: Curing | Dr.Usman Mahmood |
|  | 12/05/2023 | Dental Composites: | Dr.Usman Mahmood |
|  | 17/05/2023 | Introduction to Bonding Agent | Dr.Omair Anjum |
|  |
| Tutorial |  |
|  | 18/05/2023 | Bonding agent: Generations | Dr.Omair Anjum |
|  | 19/05/2023 | Practical: Gypsum | Dr.Omair Anjum |
|  | 24/05/2023 | Cements: Introduction to Liner and Bases | Dr.Usman Mahmood |
|  | Tutorial | Dr.Fatima Suhaib |
|  | 25/05/2023 | Cements | Dr.Usman Mahmood |
|  | 26/05/2023 | Practical: Impression taking (Alginate) | Dr.Usman Mahmood |
|  | 31/05/2023 | Dental Amalgam | Dr.Usman Mahmood |
|  | Tutorial | Dr.Fatima Suhaib |
|  | 01/06/2023 | Dental Amalgam | Dr.Usman Mahmood |
|  | 02/06/2023 | Practical: Amalgam mixing | Dr.Usman Mahmood |
|  | 07/06/2023 | Mercury Toxicity | Dr.Fatima Suhaib |
|  | Casting | Dr.Usman Mahmood |
|  |  08/06/2023 | Casting | Dr.Usman Mahmood |
|  |  09/06/2023 | Casting (Ceramics Lab) | Dr.Usman Mahmood |
|  | 16TH JUNE TO 15TH JULY 2023 | **SUMMER VACATIONS** |  |
|  | 19/07/2023 | Test II: MID TERM | Dr.Omair Anjum |
|  | 20/07/2023 | Introduction to GIC | Dr. Omair Anjum |
|  | 21/07/2023 | Glass Ionomer Cement | Dr. Omair Anjum |
|  | 26/07/2023 | Ceramics | Dr. Omair Anjum |
|  | Tutorial | Dr. Omair Anjum |
|  | 27/07/2023 | Ceramics | Dr. Omair Anjum |
|  | 28/07/2023 | Practical: cements mixing | Dr. Omair Anjum |
|  | 02/08/2023 | Ceramics | Dr. Omair Anjum |
|  | Tutorial |
|  | 03/08/2023 | Ceramics | Dr. Omair Anjum |
|  | 04/08/2023 | Introduction to Polymers | Dr. Omair Anjum |
|  | 09/08/2023 | Polymers: Denture Base | Dr. Omair Anjum |
|  | Tutorial |
|  | 10/08/2023 | Polymers | Dr. Omair Anjum |
|  | 11/08/2023 | Test III: Restorative Materials | Dr. Omair Anjum |
|  | 16/08/2023 | Polymers: lining | Dr. Omair Anjum |
|  |
| Tutorial |
|  | 17/08/2023 | Polymers | Dr. Omair Anjum |
|  | 18/08/2023 | Casting: continued from June | Dr.Usman Mahmood |
|  | 23/08/2023 | Investment Materials | Dr.Fatima Suhaib |
|  | Tutorial |
|  | 24/08/2023 | Investment Materials | Dr.Fatima Suhaib |
|  | 25/08/2023 | Revision Session I: Properties of Dental Materials | Dr.Usman Mahmood |
|  | 30/08/2023 | Revision Session II: Non-Elastic Impression Materials | Dr.Usman Mahmood |
|  | 31/08/2023 | Revision Session III: Hydrocolloids Materials | Dr.Usman Mahmood |
|  | Revision Session IV: Elastomeric Impression Materials | Dr.Usman Mahmood |
|  | Paper Discussion | Dr.Fatima Suhaib |
|  | Paper Discussion | Dr.Fatima Suhaib |
|  | 01/09/2023 | Revision Session IV: Amalgam + Amalgam crossing questioning | Dr.Usman Mahmood |
|  | 06/09/2023 | Reinforced GIC | Dr.Fatima Suhaib |
|  | Tutorial |
|  | 07/09/2023 | Revision Session IV: Amalgam | Dr.Usman Mahmood |
|  | Introduction to Research | Dr.Usman Mahmood |
|  | Group Discussion | Dr.Usman Mahmood |
|  | Topic allotment | Dr.Usman Mahmood |
|  | 08/09/2023 | TEST III: COMPOSITE | Dr.Usman Mahmood |
|  | 13/09/2023 | Revision Session V: Problem based learning Composites (cont.) | Dr.Usman Mahmood |
|  | Tutorial |
|  | 14/09/2023 | Amalgam Cross Questioning | Dr.Usman Mahmood |
|  | Amalgam Past Papers (Important Question Discussion) | Dr.Usman Mahmood |
|  | Amalgam Test Preparation | Dr.Usman Mahmood |
|  | TEST IV: AMALGAM | Dr.Usman Mahmood |
|  | 15/09/2023 | Dentures Based Polymers | Dr. Omair Anjum |
|  | 20/09/2023 | Revision Session VI: Composites Composition (cont.) | Dr.Usman Mahmood |
|  | Tutorial |
|  | 21/09/2023 | Revision Session VII: Composites Properties (cont.) | Dr.Usman Mahmood |
|  |
|  |
|  | Preparation for Presentation. Topic Research | Dr.Fatima Suhaib |
|  | Dr.Usman Mahmood |
|  | 22/09/2023 | Research Discussion | Dr.Fatima Suhaib |
|  | 27/09/2023 | Introduction to Metals | Dr.Usman Mahmood |
|  | Tutorial |
|  | 28/09/2023 | Gold Alloys | Dr.Usman Mahmood(03 Lectures) |
|  |
|  | Assignment on Gold alloys |
|  | Research Discussion | Dr.Fatima Suhaib |
|  | 29/09/2023 | Research Discussion and presentation preparation | Dr.Fatima Suhaib |
|  | 04/10/2023 | Soldering | Dr.Usman Mahmood |
|  | Tutorial: wrought Iron Assignment | Dr.Usman Mahmood |
|  | 05/10/2023 | Introduction to Casting Alloys | Dr.Omair Anjum |
|  | Noble Metal Alloys | Dr.Omair Anjum |
|  | Research Discussion | Dr.Fatima Suhaib |
|  | Research Discussion | Dr.Usman Mahmood |
|  | 06/10/2023 | High noble metal Alloys | Dr.Omair Anjum |
|  | 11/10/2023 | Wrought Alloys | Dr.Usman Mahmood |
|  | Tutorial | Dr.Usman Mahmood |
|  | 12/10/2023 | Research Based Presentations: with Dental Materials Faculty | Dr.Usman Mahmood |
|  | Dr.Usman Mahmood |
|  | Dr.Usman Mahmood |
|  | Dr.Usman Mahmood |
|  | 13/10/2023 | Dental Implants | Dr.Fatima Suhaib |
|  | 18/10/2023 | Top 5 GroupsResearch Based Presentations: with Dental Materials Faculty& Dean of the Institution | Dr.Usman Mahmood |
|  | Dr.Usman Mahmood |
|  | 19/10/2023 | Base Metal Alloys | Dr.Omair Anjum |
|  | Revision Session VIII: Dental Casting Alloys | Dr.Omair Anjum |
|  | Dental Casting Alloys Group Discussion | Dr.Omair Anjum |
|  | Dental Casting Alloys Assignment | Dr.Omair Anjum |
|  | 20/10/2023 | PFM | Dr.Fatima Suhaib |
|  | 25/10/2023 | Dental Waxes | Dr.Fatima Suhaib |
|  | Tutorial: Dental Waxes Assignment | Dr.Fatima Suhaib |
|  | 26/10/2023 | Endodontic Materials | Dr.Fatima Suhaib |
|  | Endodontic Materials | Dr.Fatima Suhaib |
|  | Revision Session IX: Biocompatibility & Cements | Dr.Fatima Suhaib |
|  | Dr.Fatima Suhaib |
|  | 27/10/2023 | Revision Session X: Wrought Alloys | Dr.Usman Mahmood |
|  | 01/11/2023 | Revision Session XI: Casting | Dr.Usman Mahmood |
|  | Tutorial | Dr.Usman Mahmood |
|  | 02/11/2023 | Revision Session XII: Gypsum Products & Glass Ionomer Cements. | Dr.Omair Anjum |
|  | Dr.Omair Anjum |
|  | UQ’s Discussion & Question Answer Session | Dr.Omair Anjum |
|  | Dr.Omair Anjum |
|  | 03/11/23 | Revision Session XIII: PolymersFollowed by Polymer Mixing Demonstration and Practical | Dr.Omair Anjum |
|  | 08/11/2023 | Revision  |  |
|  | 09/11/2023 | IQBAL DAY |  |
|  | 10/11/2023 | Revision Session XIV: Casting & Soldering | Dr.Usman Mahmood |
|  | Dr.Usman Mahmood |
|  | Revision Session XV: Dental Implants & waxes | Dr.Fatima Suhaib |
|  | Dr.Fatima Suhaib |
|  | 15/11/2023 | Revision Session XVI: Gold Alloys | Dr.Usman Mahmood |

**Allocation of hours, No. of Lectures/ activities Large group teaching**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Topics** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Total** |
| **Properties used to characterize Materials** |  |  |  |  |  |  |  |  |  |  |
| **Gypsum** |  |  |  |  |  |  |  |  |  |  |
| **Waxes** |  |  |  |  |  |  |  |  |  |  |
| **Investments and Refractory Dies** |  |  |  |  |  |  |  |  |  |  |
| **Metals and Alloys** |  |  |  |  |  |  |  |  |  |  |
| **Ceramics** |  |  |  |  |  |  |  |  |  |  |
| **Polymers** |  |  |  |  |  |  |  |  |  |  |
| **Impression Materials** |  |  |  |  |  |  |  |  |  |  |
| **Dental Amalgam** |  |  |  |  |  |  |  |  |  |  |
| **Dental Composites** |  |  |  |  |  |  |  |  |  |  |
| **Bonding** |  |  |  |  |  |  |  |  |  |  |
| **GIC** |  |  |  |  |  |  |  |  |  |  |
| **Cements** |  |  |  |  |  |  |  |  |  |  |
| **Endodontic Materials** |  |  |  |  |  |  |  |  |  |  |
| **Total** |  |  |  |  |  |  |  |  |  |  |

|  |
| --- |
| Color coding |
| Prof. Dr. Usman Mahmood |  |
| Dr Omair Anjum |  |
| Dr. Fatima Suhaib |  |

# Small group teaching

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sr. No** | **Activities** | **No. of weeks** | **Facilitators** | **Supervisors** |
| **1** | **Practicals (every week: 150 minutes)** | **36** | **Dr Fatima Liaqat****Dr Maida Iqbal** | **Prof. Dr Usman Mahmood****Dr Omair Anjum****Dr Fatima Suhaib** |
| **2** | **Tutorials****(every week: 60****minutes)** | **36** | **Dr Fatima Liaqat****Dr Maida Iqbal** | **Prof. Dr Usman Mahmood****Dr Omair Anjum****Dr Fatima Suhaib** |

|  |
| --- |
| **TEST / EXAM PLANNER** |
| **TEST** | **Date / Week** | **THEORY** | **SYLLABUS** |
| **MARKS** | **NO OF MCQs** | **NO OF SEQs** |
| 1 | 26/04/2023Week 9 | 30 | 15 | 3 | Properties and Impression Materials |
| 2 | 24/05/2023Week 13 | 30 | 15 | 3 | Gypsum, Investments, Polymers |
| 3 | 26/07/2023Week 22 | 50 | 30 | 5 | Midterm Theory |
| 4 | 23/8/23Week 25 | 50 | OSPE & VIVA VOCE |  Course covered so far |
| 5 | 27/09/2023Week 29 | 50 | 30 | 5 | Restorative Materials, Cements |
| 6 | 25/10/2023Week 33 | 100 | 45 | 15 | Send up Exam Theory and Viva  Presentations (10 marks) |

 **5. Dental Materials Time Table**

|  |  |
| --- | --- |
| **MONDAY** |  **—** |
| **TUESDAY** | **—** |
| **WEDNESDAY** | **11:45am - 12:30pm** | **12:30pm - 2:30pm** |
| **Lecture Theatre 5** | **Lecture Theatre 5** |
| **THURSDAY** | **11:45am - 12:30pm** | **—** |
| **Lecture Theatre 5** |
| **FRIDAY** | **8:00am - 10:30am** | **—** |
| **Dental Materials Lab** |

#  6. TEACHING AND LEARNING METHODOLOGIES

1. Large group teaching strategies
	* Lectures
	* Interactive sessions
2. Small group teaching strategies:
	* Employed during practical’s (weekly) and tutorials (weekly)
	* Interactive sessions
	* Small group discussions (SGDs)
	* Take home assignments
	* SEQ and MCQ exercises
	* Viva voce
	* Presentations by students
	* Laboratory demonstrations and practical’s

**7. RECOMMENDED TEXTBOOKS:**

* + Restorative Dental materials by Robert. Craig
	+ Notes on dental materials by Shahina Nusrat
	+ Clinical Handling of Dental Materials by B.N Smith
	+ Notes on Dental Materials by E.C.Combe
	+ Dental Chemistry by Cunnigham
* Philips Science of Dental Materials
* McCabe Applied Dental Materials

# 8. ASSESSMENT FORMATS

All assessments are meticulously planned in collaboration with other concerned departments to avoid clustering/overlapping and schedule is given to the students in advance. At least one dental materials test is conducted each month. Topics included in each test are notified and resources are identified.

1. Written tests

Written class tests include MCQs (one best type) and SEQs. University recommendations for marks distribution are strictly followed.

1. Oral examination

In order to prepare the students for oral component of university examination, viva voce examinations (by senior faculty members) are also conducted during the session.

1. Send up examination

Send up is a comprehensive examination including whole dental materials course that is conducted at the end of academic session and final university examination pattern is followed in every respect (no. of questions, ToS, marks distribution, total time allowed etc.).

# 9. ONLINE TEACHING

During covid-19 pandemic, teaching was continued online for 2nd year BDS. Online time tables were formulated by consensus of all the concerned departments. Students, faculty and concerned staff was optimally trained and facilitated by IT and DME. Lectures and tutorials were held using Google meet and Microsoft teams. Class tests were conducted in Google class room. Assignments, hand-outs, and other necessary information were shared on web portal of LMDC, Google class room and Microsoft teams. Online viva was conducted using zoom software program. Online attendance record was meticulously maintained and added to the total record.

In case of lockdown, similar strategies would be employed for both synchronous and asynchronous e-learning program.

# 10. ROBUST FEEDBACK SYSTEMS

1. Feedback on attendance

Attendance report is forwarded to students and parents on daily basis through the LMDC web portal

 b. Feedback on academic performance

Academic performance report is also regularly forwarded to students and parents. Moreover, individual students are given feedback on their academic performance during tutorials. MCQ and SEQ papers are also discussed with students in small groups.

1. Parents of weak students are regularly contacted (PTM sessions)

# 11. COUNSELING FACILITIES FOR STUDENTS

1. Senior faculty members of dental materials department are actively involved in resolving academic and non-academic issues of allocated students (PTS sessions)
2. Individual students are also referred to the student counselor, if needed

# 12. SUMMER VACATIONS AND REMEDIAL CLASSES

Summer vacations= 4 weeks

Remedial classes are mandatory for students who:

1. Join late
2. Have poor attendance/test performance or both in term I