

Republic of Yemen
Ministry of Higher Education & Scientific Research

Emirates International University



Faculty of Dentistry
Department of Conservative Dentistry
Doctor of Dental Surgery (DDS)

Course Specification of
Dental Materials I
Course No. (-----)



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Review committee:

Head of the Department

Quality Assurance head

Dean of Faculty



II. Course Identification and General Information:

| | | | | | |
|----|--|--------------------------------------|--------------|----------|------------|
| 1 | Course Title: | Dental Materials I | | | |
| 2 | Course Code & Number: | ---- | | | |
| 3 | Credit Hours: | Credit Hours | Theory Hours | | Lab. Hours |
| | | | Lecture | Exercise | |
| | | 3 | 2 | -- | 2 |
| 4 | Study Level/ Semester at which this Course is offered: | 2nd Level / 1st Semester | | | |
| 5 | Pre –Requisite (if any): | ----- | | | |
| 6 | Co –Requisite (if any): | None | | | |
| 7 | Program (s) in which the Course is Offered: | Doctor of Dental Surgery (DDS) | | | |
| 8 | Language of Teaching the Course: | English | | | |
| 9 | Study System: | Semester based System | | | |
| 10 | Mode of Delivery: | Full Time | | | |
| 11 | Location of Teaching the Course: | Faculty of Dentistry | | | |
| 12 | Prepared by: | Assoc. Prof. Dr. Ibrahim Z. Al-Shami | | | |

III. Course Description:

This is an essential course designed to provide students with basic knowledge of the terminology, composition, properties, biocompatibility, manipulation and mixing of dental materials used in the dental office and dental laboratory including gypsum products, impression materials (hydrocolloids and rubber base), resins, waxes, restorative materials, cements, cavity liners, varnishes, amalgam, casting metals and alloys, ceramics with practical applications. This course helps students in differentiation between dental materials and selection of the most appropriate ones.



| III. Course Intended Learning Outcomes (CILOs): Upon successful completion of the course, students will be able to: | | Referenced PILOs Learning out of program | | |
|--|---|---|----|--|
| A. Knowledge and Understanding: | | I, A or E | | |
| a1 | Describe the composition, physical and chemical properties of various dental materials and how these allow the materials to behave. | | A1 | |
| a2 | Recognize the criteria for the selection of materials for specific dental procedures and Describe the fundamental strength and weakness of each material. | | A4 | |
| a3 | Explain indirect restorations and the technique and material used in casting procedures. | | A5 | |
| B. Intellectual Skills: | | | | |
| b1 | Discuss the effect of various clinical procedures on materials' properties | | B5 | |
| b2 | Demonstrate the properties, handling characteristics, advantages and disadvantages of dental materials | | B1 | |
| b3 | Differentiate between different types of impression materials. | | B5 | |
| C. Professional and Practical Skills: | | | | |
| c1 | Select and evaluate various dental materials based on scientific understanding of their structure and properties | | C7 | |
| c2 | Perform, handle and manipulate various materials used in dentistry. | | C7 | |
| D. Transferable Skills: | | | | |
| d1 | Communicate and work effectively and | | D3 | |

| | | | | |
|----|---|--|----|--|
| | respectful with staff and colleagues | | | |
| d2 | Manage time, set priorities and work to prescribed time limits. | | D4 | |

| (A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods: | | | |
|--|---|---|---|
| Course Intended Learning Outcomes | | Teaching Strategies | Assessment Strategies |
| a1 | Describe the composition, physical and chemical properties of various dental materials and how these allow the materials to behave. | <ul style="list-style-type: none"> ▪ Lectures ▪ Discussions | <ul style="list-style-type: none"> ▪ Quizzes ▪ Midterm Exam ▪ Final Exam |
| a2 | Recognize the criteria for the selection of materials for specific dental procedures and Describe the fundamental strength and weakness of each material. | <ul style="list-style-type: none"> ▪ Lectures ▪ Discussions | <ul style="list-style-type: none"> ▪ Quizzes ▪ Midterm Exam ▪ Final Exam |
| a3 | Explain indirect restorations and the technique and material used in casting procedures. | <ul style="list-style-type: none"> ▪ Lectures ▪ Discussions | <ul style="list-style-type: none"> ▪ Quizzes ▪ Midterm Exam ▪ Final Exam |
| (B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods: | | | |
| Course Intended Learning Outcomes | | Teaching Strategies | Assessment Strategies |
| b1 | Discuss the effect of various clinical procedures on materials' properties | <ul style="list-style-type: none"> ▪ Lectures ▪ Discussions | <ul style="list-style-type: none"> ▪ Quizzes ▪ Midterm Exam ▪ Final Exam |
| b2 | Demonstrate the properties, handling characteristics, advantages and disadvantages of dental materials | <ul style="list-style-type: none"> ▪ Lectures ▪ Discussions | <ul style="list-style-type: none"> ▪ Quizzes ▪ Midterm Exam ▪ Final Exam |
| b3 | Differentiate between different types of impression materials. | <ul style="list-style-type: none"> ▪ Lectures ▪ Discussions | <ul style="list-style-type: none"> ▪ Quizzes ▪ Midterm Exam ▪ Final Exam |
| (C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods: | | | |
| Course Intended Learning Outcomes | | Teaching Strategies | Assessment Strategies |

| | | | |
|--|---|--|---|
| c1 | Select the most appropriate material. | <ul style="list-style-type: none"> Practical Sessions Demonstrations | <ul style="list-style-type: none"> Practical Exams Semester work |
| c2 | Handle, manipulate various materials used in dentistry. | <ul style="list-style-type: none"> Practical Sessions Demonstrations | <ul style="list-style-type: none"> Practical Exams Semester work |
| (D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods: | | | |
| Course Intended Learning Outcomes | | Teaching Strategies | Assessment Strategies |
| d1 | Communicate and work effectively and respectful with staff and colleagues | <ul style="list-style-type: none"> Discussions Practical Sessions | <ul style="list-style-type: none"> Direct Observation Practical Exam Semester Work |
| d2 | Manage time, set priorities and work to prescribed time limits. | <ul style="list-style-type: none"> Discussions Practical Sessions | <ul style="list-style-type: none"> Direct Observation Practical Exam Semester Work |

IV. Course Contents:

A. Theoretical Aspect:

| No. | Units/Topics List | Sub Topics List | Number of Weeks | Contact Hours | Learning Outcomes (CILOs) |
|-----|----------------------------------|--|-----------------|---------------|---------------------------|
| 1 | Introduction to Dental Materials | <ul style="list-style-type: none"> Materials in Dentistry Definition and importance. Structure of dental materials Classifications | 1 | 2 | a1 a2, b1 |
| 2 | Dental materials properties | <ul style="list-style-type: none"> Physical, mechanical, chemical and biological properties | 2 | 4 | a1, a3, b1, b2 |
| 3 | Gypsum products | <ul style="list-style-type: none"> Types Indication Usage | 1 | 2 | a1, a3, b1, b2 |
| 4 | Impression materials | <ul style="list-style-type: none"> Classification Indication Usage Properties of impression materials | 3 | 6 | a1, a3, b1, b2, b3 |

| No. | Units/Topics List | Sub Topics List | Number of Weeks | Contact Hours | Learning Outcomes (CILOs) |
|--|------------------------------------|--|-----------------|---------------|---------------------------|
| 5 | Midterm Exam | MCQs and essay questions | 1 | 2 | a1, a3, b1, b2 |
| 6 | Investments | <ul style="list-style-type: none"> - Types - Materials - Indication - Usage | 1 | 2 | a1, a3, b1, b2 |
| 7 | Waxes | <ul style="list-style-type: none"> - Types - Composition - Indication and Usage - Investment | 2 | 4 | a1, a2, a3, b1, b2 |
| 8 | Non-metallic denture base material | <ul style="list-style-type: none"> - History, types. - Polymers, polymerization, PMMA. - Heat and cold cure. - Properties. | 2 | 4 | a1, a3, b1, b2 |
| 9 | Metallic dental materials | <ul style="list-style-type: none"> - Precious, non-precious metals, - Stainless steel and metallic denture base materials - Metals for crown and bridge | 2 | 4 | a1, a3, b1, b2 |
| 10 | Final Exam | MCQs and essay questions | 1 | 2 | a1, a2, a3, b1, b2, b3 |
| Number of Weeks /and Units Per Semester | | | 16 | 32 | |

B. Case Studies and Practical Aspect:

| No. | Tasks/ Experiments | Week Due | Contact Hours | Learning Outcomes (CILOs) |
|-----|---|--|---------------|---------------------------|
| 1 | Introduction to materials used in dentistry | 3 rd week | 2 | c1, c2, d1, d2 |
| 3 | <p>- Gypsum:</p> <p>a. Mixing: of P - O - P, dental stone and die stone</p> <p>b. Fabrication: cube and pyramid of given dimensions</p> | 4 th and 5 th week | 4 | c1, c2 |

| No. | Tasks/ Experiments | Week Due | Contact Hours | Learning Outcomes (CILOs) |
|--|---|--|---------------|---------------------------|
| | c. Duplication: of master cast | | | |
| 4 | <p>- Impression Material:</p> <p>a. Thumb impression in compound and subsequently poured in plaster</p> <p>b. Mixing of various impression material and their respective clinical use highlighted</p> <p>c. Impression making on acrylic models, edentulous and dentulous arches</p> | 6 th to 8 th week | 6 | c1, c2, d1, d2 |
| 5 | <p>- Dental investment material : Gypsum bonded, phosphate bonded and silicate bonded</p> | 9 th and 10 th week | 4 | c1, c2, d1, d2 |
| 6 | <p>- Dental waxes:</p> <p>a. Introduction to dental waxes and demonstration of wax up procedure</p> | 11 th and 12 th week | 4 | c1, c2, d1, d2 |
| 7 | <p>- Introduction to denture base resins</p> <p>- Acrylic Base Materials</p> | 13 th and 14 th week | 4 | c1, c2, d1, d2 |
| 8 | Practical Exam | 15 th | 2 | c1, c2, d1, d2 |
| Number of Weeks /and Units Per Semester | | 13 | 26 | |

V. Teaching Strategies of the Course:

- Lectures
- Practical Sessions
- Demonstrations
- Discussions

VI. Assessment Methods of the Course:

- Quizzes
- Midterm Exam
- Final Exam
- Practical Exam
- Semester work
- Direct Observation

VII. Assignments:

| No. | Assignments | Week Due | Mark | Aligned CILOs (symbols) |
|--------------|--|------------------------------------|-----------|-------------------------|
| 1 | <ul style="list-style-type: none"> ▪ Semester work: - (Practical Requirements) | 3 rd - 14 th | 10 | c1, c2, d1, d2 |
| Total | | | 10 | |

VIII. Schedule of Assessment Tasks for Students During the Semester:

| No. | Assessment Method | Week Due | Mark | Proportion of Final Assessment | Aligned Course Learning Outcomes |
|--------------|-------------------|------------------------------------|------------|--------------------------------|----------------------------------|
| 1 | Assignments | 3 rd - 14 th | 10 | 10 % | c1, c2, d1, d2 |
| 2 | Quizzes | 6 th | 5 | 5 % | a1, a2, a3, b1, b2 |
| 3 | Midterm Exam | 8 th | 20 | 20 % | a1, a3, b1, b2, b3 |
| 4 | Practical Exam | 15 th | 15 | 15 % | c1, c2, d1, d2 |
| 5 | Final Exam | 16 th | 50 | 50 % | a1, a2, a3, b1, b2, b3 |
| Total | | | 100 | 100% | |

IX. Learning Resources:

1- Required Textbook(s):

- 1- Kenneth Anusavice, Chiayi Shen H., Ralph Rawls, 2012: Phillips Science of Dental Materials- 12th edition, Saunders, USA.
- 2- Ronald Sakaguchi, Jack Ferracane, John Powers, 2011: Craig's Restorative Dental Materials. 13th edition, Mosby, USA.

2- Essential References:

- 1- John Powers, John Wataha, 2012: Dental Materials: properties and manipulation 10th edition, Mosby, USA.
- 2- John F. McCabe, Angus Walls, 2008: Applied dental materials, 9th edition, Blackwell, USA

3- Electronic Materials and Web Sites etc.:

Websites

- 1- Academy of Dental Materials
<https://www.journals.elsevier.com/dental-materials>
- 2- International Journal of Dental Materials (IJDM)
<https://www.ijdm.co.in>
- 3- Dental Materials Journal
[https:// www.academydentalmaterials.com](https://www.academydentalmaterials.com)

X. Course Policies: (Based on the Uniform Students' By law (2007))

| | |
|---|---|
| | Class Attendance: |
| 1 | Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes. |
| | Tardiness: |
| 2 | A student will be considered late if he/she is not in class after 10 minutes of the start time of class. |
| | Exam Attendance/Punctuality: |
| 3 | No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed. |
| | Assignments & Projects: |
| 4 | Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same. |
| | Cheating: |
| 5 | |

| | |
|---|--|
| | <p>Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p> |
| 6 | <p>Forgery and Impersonation: Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p> |
| 7 | <p>Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p> |

Faculty of Dentistry
Department of Conservative Dentistry
Program of
Doctor of Dental Surgery (DDS)

Course Plan (Syllabus) of
Dental Materials I
Course No. (-----)

| I. Information about Faculty Member Responsible for the Course: | | | | | | | |
|---|--|--------------|-----|-----|-----|-----|-----|
| Name of Faculty Member: | | Office Hours | | | | | |
| Location & Telephone No.: | | | | | | | |
| E-mail: | | SAT | SUN | MON | TUE | WED | THU |

I. Course Identification and General Information:

| | | | | | |
|----|--|--------------------------------------|--------------|----------|------------|
| 1 | Course Title: | Dental Materials I | | | |
| 2 | Course Code & Number: | ---- | | | |
| 3 | Credit Hours: | Credit Hours | Theory Hours | | Lab. Hours |
| | | | Lecture | Exercise | |
| | | 3 | 2 | -- | 2 |
| 4 | Study Level/ Semester at which this Course is offered: | 2 nd Level / 1st Semester | | | |
| 5 | Pre –Requisite (if any): | ----- | | | |
| 6 | Co –Requisite (if any): | None | | | |
| 7 | Program (s) in which the Course is Offered: | Doctor of Dental Surgery (DDS) | | | |
| 8 | Language of Teaching the Course: | English | | | |
| 9 | Study System: | Semester based System | | | |
| 10 | Mode of Delivery: | Full Time | | | |
| 11 | Location of Teaching the Course: | Faculty of Dentistry | | | |
| 12 | Prepared by: | Assoc. Prof. Dr. Ibrahim Z. Al-Shami | | | |

II. Course Description:

This is an essential course designed to provide students with basic knowledge of the terminology, composition, properties, biocompatibility, manipulation and mixing of dental materials used in the dental office and dental laboratory including gypsum products, impression materials (hydrocolloids and rubber base), resins, waxes, restorative materials, cements, cavity liners, varnishes, amalgam, casting metals and alloys, ceramics with practical applications. This course helps students in differentiation between dental materials and selection of the most appropriate ones.



IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

| | |
|----|---|
| | A. Knowledge and Understanding: |
| a1 | Describe the composition, physical and chemical properties of various dental materials and how these allow the materials to behave. |
| a2 | Recognize the criteria for the selection of materials for specific dental procedures and Describe the fundamental strength and weakness of each material. |
| a3 | Explain indirect restorations and the technique and material used in casting procedures. |
| | B. Intellectual Skills: |
| b1 | Discuss the effect of various clinical procedures on materials' properties |
| b2 | Demonstrate the properties, handling characteristics, advantages and disadvantages of dental materials |
| b3 | Differentiate between different types of impression materials. |
| | C. Professional and Practical Skills: |
| c1 | Select and evaluate various dental materials based on scientific understanding of their structure and properties |
| c2 | Perform, handle and manipulate various materials used in dentistry. |
| | D. Transferable Skills: |
| d1 | Communicate and work effectively and respectful with staff and colleagues |
| d2 | Manage time, set priorities and work to prescribed time limits. |

V. Course Contents:

A. Theoretical Aspect:

| No. | Units/Topics List | Sub Topics List | Number of Weeks | Contact Hours |
|-----|----------------------------------|--|-----------------|---------------|
| 1 | Introduction to Dental Materials | <ul style="list-style-type: none"> - Materials in Dentistry - Definition and importance. - Structure of dental materials - Classifications | 1 | 2 |

| V. Course Contents: | | | | |
|--|------------------------------------|--|------------------------|----------------------|
| A. Theoretical Aspect: | | | | |
| No. | Units/Topics List | Sub Topics List | Number of Weeks | Contact Hours |
| 2 | Dental materials properties | – Physical, mechanical, chemical and biological properties | 2 | 4 |
| 3 | Gypsum products | – Types – Indication – Usage | 1 | 2 |
| 4 | Impression materials | – Classification – Indication – Usage – Properties of impression materials | 3 | 6 |
| 5 | Midterm Exam | MCQs and essay questions | 1 | 2 |
| 6 | Investments | – Types – Materials – Indication – Usage | 1 | 2 |
| 7 | Waxes | – Types – Composition – Indication and Usage – Investment | 2 | 4 |
| 8 | Non-metallic denture base material | – History, types. – Polymers, polymerization, PMMA. – Heat and cold cure. – Properties. | 2 | 4 |
| 9 | Metallic dental materials | – Precious, non-precious metals, – Stainless steel and metallic denture base materials – Metals for crown and bridge | 2 | 4 |
| 10 | Final Exam | MCQs and essay questions | 1 | 2 |
| Number of Weeks /and Units Per Semester | | | 16 | 32 |

| B. Case Studies and Practical Aspect: | | | |
|--|--|---|----------------------|
| No. | Tasks/ Experiments | Week Due | Contact Hours |
| 1 | Introduction to materials used in dentistry | 3 rd week | 2 |
| 3 | - Gypsum: a. Mixing: of P - O - P, dental stone and die stone b. Fabrication: cube and pyramid of given dimensions c. Duplication: of master cast | 4 th and 5 th week | 4 |
| 4 | - Impression Material: a. Thumb impression in compound and subsequently poured in plaster b. Mixing of various impression material and their respective clinical use highlighted c. Impression making on acrylic models, edentulous and dentulous arches | 6 th to 8 th week | 6 |
| 5 | - Dental investment material : Gypsum bonded, phosphate bonded and silicate bonded | 9 th and 10 th week | 4 |
| 6 | - Dental waxes: a. Introduction to dental waxes and demonstration of wax up procedure | 11 th and 12 th week | 4 |
| 7 | - Introduction to denture base resins - Acrylic Base Materials | 13 th and 14 th week | 4 |
| 8 | Practical Exam | 15 th | 2 |
| Number of Weeks /and Units Per Semester | | 13 | 26 |

VI. Teaching Strategies of the Course:

- Lectures
- Practical Sessions
- Demonstrations
- Discussions

VII. Assessment Methods of the Course:

- Quizzes
- Midterm Exam
- Final Exam
- Oral exams
- Practical Exam
- Semester work
- Direct Observation

VIII. Assignments:

| No. | Assignments | Week Due | Mark |
|--------------|--|------------|-----------|
| 1 | Semester work: (Practical Requirements) | 3rd - 14th | 10 |
| Total | | | 10 |

IX. Schedule of Assessment Tasks for Students During the Semester:

| No. | Assessment Method | Week Due | Mark | Proportion of Final Assessment |
|--------------|-------------------|------------------------------------|------------|--------------------------------|
| 1 | Assignments | 3 rd - 14 th | 10 | 10 % |
| 2 | Quizzes | 6 th | 5 | 5 % |
| 3 | Midterm Exam | 8 th | 20 | 20 % |
| 4 | Practical Exam | 15 th | 15 | 15 % |
| 5 | Final Exam | 16 th | 50 | 50 % |
| Total | | | 100 | 100% |

X. Learning Resources:

1- Required Textbook(s):

Kenneth Anusavice, Chiayi Shen H., Ralph Rawls, 2012: Phillips Science of Dental Materials-12th edition, Saunders, USA.

Ronald Sakaguchi, Jack Ferracane, John Powers, 2011: Craig's Restorative Dental Materials.

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| 13th edition, Mosby, USA. |
| 2- Essential References: |
| John Powers, John Wataha, 2012: Dental Materials: properties and manipulation 10th edition, Mosby, USA. John F. McCabe, Angus Walls, 2008: Applied dental materials, 9th edition, Blackwell, USA |
| 3- Electronic Materials and Web Sites etc.: |
| Websites |
| 3- 1- Academy of Dental Materials |
| 4- https://www.journals.elsevier.com/dental-materials |
| 5- |
| 2- International Journal of Dental Materials (IJDM) https://www.ijdm.co.in |
| 3- Dental Materials Journal https:// www.academydentalmaterials.com |
| -1 |

| XI. Course Policies: (Based on the Uniform Students' Bylaw (2007)) | |
|---|---|
| | Class Attendance: |
| 1 | Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes. |
| | Tardiness: |
| 2 | A student will be considered late if he/she is not in class after 10 minutes of the start time of class. |
| | Exam Attendance/Punctuality: |
| 3 | No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed. |
| | Assignments & Projects: |
| 4 | Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same. |
| | Cheating: |
| 5 | Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply. |
| | Forgery and Impersonation: |
| 6 | Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, |

| | |
|---|--|
| | assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply. |
| 7 | Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration. |

