Republic of Iraq

Ministry of Higher Education & Scientific Research

Supervision and Scientific Evaluation Directorate

Quality Assurance and Academic Accreditation

InternationalAccreditation Dept.

Academic Program Specification FormFor The Academic Year 2017-2018

Universitiy: Baghdad

College : Engineering

Number Of Departments In The College : 12 Twelve

Date Of Form Completion : April – 3 / 2018

Dean ’s Name

Date : / 4 / 2018

Signature

Dean ’s Assistant For Scientific Affairs

Date : / / 2018

Signature

The College Quality Assurance And University Performance Manager

Date : / / 2018

Signature

Quality Assurance And University Performance Manager

Date : / / 2018

Signature

**TEMPLATE FOR COURSE SPECIFICATION**

|  |
| --- |
| HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW |

**COURSE SPECIFICATION**

|  |
| --- |
| This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve anddemonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification. |

|  |  |
| --- | --- |
| College of Engineering  University of Baghdad | ***1. Teaching Institution*** |
| Mechanical Engineering Department (MED) | ***2. University Department/Centre*** |
| Engineering Materials / ME 406  Description of course include the fundamentals of materials science , these topics are : **types of materials** (metals , polymers , composite materials ) , **mechanical properties of materials** (stress – strain curve behavior , hardness , ductility , ele. ) , **mechanical tests** : (hardness test , tensile test , toughness test ) ,**failure of materials** : (fracture , fatigue failure , creep) ,**ferrous metals**: (carbon steel , alloy steel , stainless steel , cast iron , super alloys) , **non- ferrous metals** : (aluminum & its alloys , copper & its alloys , magnesium &its alloys , titanium &its alloys), **advanced materials :** ( nano materials , bio materials , semi- conducter materials). .( corrosion and cathodic protection , polymers , composites , refractories  The course is taught through (3 )hrsper week  . | ***3. Course title/code& Description*** |
| Mechanical Engineering ( ME) | ***4. Programme(s) to which itContributes*** |
|  | ***5. Modes of Attendance offered*** |
| 1st & 2nd 6. Semester/Year / Academic Year 2017 – 2018 | ***6. Semester/Year*** |
| 90 hrs. / 3 hrs. per week | ***7. Number of hours tuition (total)*** |
| April – 13 / 2018 | ***8. Date of production/revision of this specification*** |
| ***9. Aims of the Course*** | |
| 1. to introduce the students to the relationships that exist between the structure and properties of engineering materials .  2. To introduce the students to the production, properties and application of the major groups of engineering materials  3. to allow the students to interpret the phase diagrams of metals and alloys and use them in thermal processing of the materials  4. to introduce the students to the basic principles involved in materials selection based on the properties of materials and failure in service.  5.Explain and derive the laws that govern the stress-strain curve , ductility , true &engineering stress- strain curve .  6.Introduce the principles of mechanical tests of materials .  7.Introduce the principles of failure of metals .  8. Introduce the information about the ferrous metals and non ferrousmetal ,their properties , alloys , uses , and heat treatments .  9. Provide the students a strong understanding of selection of materials and their alloys for a suitable applications .  10. Enable the student to understand the engineering materials properties and manufacturing techniques used to produce components capable to work in certain conditions and how to protect them from corrosion through certain procedures. | |

|  |
| --- |
| ***10·Learning Outcomes*** |
| At the end of the class, the student will be able to:Enable the student to a.Understand how to use the knowlege of this course to improving his ability in problems concerning  b. applying basic mathematical and scientific concepts for the description and solution of engineering problems in engineering materials field.  c. developing initial proficiency in mechanical engineering disciplines.  d. developing the ability to conduct experiments, and critically analyze and interpret data.  e. performing mechanical engineering integrated design of systems, components, orprocesses by means of practical experiences (group pro  f. identifying, formulate, and solve mechanical engineering problems using modernengineering tools, techniques, and skills collaborating in group projects.  g. developing their written and oral communication skills through presentations ofproject results.  h. acquiring an appreciation for some of the ethical problems that arise in the exercise of the profession.  i. understanding the engineering materials ,and their different properties , tests , failure. |
| ***11.Teaching and Learning Methods*** |
| 1.Lectures.  2. Homework and Assignments.  3.Tests and Exams.  4.In-Class Questions and Discussions.  5.Field Trips.  6. Seminars.  7. Reports, Presentations, and Posters. |
| ***12. Assessment Methods***  **1. Examinations, Tests, and Quizzes.**  **2. Extracurricular Activities.**  **3. Student Engagement during Lectures.**  **4. Responses Obtained from Students, Questionnaire about**  **Curriculum and Faculty Member ( Instructor ).** |
| ***13. Grading Policy***  1.Quizzes:  - There will be a ( 8-10 ) closed books and notes quizzes  during the academic year.  - The quizzes will count 20% of the total course grade.  2. Tests, 2 Nos. and will count 10% of the total course grade.  3. Extracurricular Activities, this is optional and will count extra  marks ( 1 – 5 % ) for the student, depending on the type of activity.  4. Homework:  - There are a minimum of eight of homework during the academic year.  -the homework is submitted at the beginning of the class before the start of the lecture.  5. Final Exam:  - The final exam will be comprehensive, closed books and  notes, and will take place on January 2018 from 9:00 AM - 12:00 PM  in rooms ( M12 + M13)  - The final exam will count 70% of the total course grade |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***14. Course Structure*** | | | | | |
| Assessment  Method | Teaching  Method | Unit/Module or  Topic Title | LOs  ( Article  10 ) | hours | Week |
| (1-4) of  Article 12 | (1-7)of  Article 11 | Types of engineering materials  ----------  Corrosion&cathodic production | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 1 |
| (1-4)of  Article 12 | (1-7)of  Article 11 | Mechanical properties of materials  -------------------  Corrosion &cathodic protection | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 2 |
| (1-4) of  article 12 | (1-7)of  Article 11 | Mechanical properties of materials  ---------------  Corrosion &cathodic protection | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 3 |
| (1-4)of  article 12 | (1-7) of  Article 11 | Mechanical tests of materials / tensile test / stress- strain curve  ---------------------  Types of corrosion | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 4 |
| (1-4) 0f  article 12 | (1-7) of  Article 11 | Stress- strain curve /applications  -----------------  Types of corrosion | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 5 |
| (1-4) of  article 12 | (1-7) of  Article 11 | Hardness test  ---------------  Methods of corrosion protection | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 6 |
| (1-4) of  article 12 | (1-7) of  Article 11 | Toughness test  -----------------  Methods of corrosion protection | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 7 |
| (1-4)of  article 12 | (1-7) of  Article 11 | Failure of materials / fracture  -----------------  Methods of corrosion protection | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 8 |
| = | (1-7) of  Article 11 | Failure of materials / fatigue failure  --------------  composites | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 9 |
| = | = | Fatigue failure  ----------  Composites | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 10 |
| = | (1-7) of  Article 11 | Failure of materials /  Creep  ---------------  Physical&mechanical  Properties | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 11 |
| = | (1-7) of article 11 | Applications  ---------------  Physical&mechanical  Properties | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 12 |
| = | (1-7) of article 11 | Ferrous metal / carbon steel /introduction  ---------------  Discotinous fibers | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 13 |
| = |  | Ferrous metal  Types of carbon steel  -----------  Discotinous fibers | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 14 |
| = | = | Alloy steel / types /properties  -----------  Polymers | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 15 |
| = | = | Tool steel  -----------  Polymers | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 16 |
| = | = | Stainless steel / properties / uses  ------------  Degree of polymeraization | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 17 |
| = | = | types of stainless  steel  ----------  Degree of polymeraization | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 18 |
| = | = | Cast iron  ----------------degree of polymeraization | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 19 |
| = | = | Cast iron  -------------  Physical & mechanical propertie | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 20 |
| = | = | Super alloy  -------------  Physical & mechanical propertie | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 21 |
| = | = | Non –ferrous metal /introduction  ----------  Physical & mechanical propertie | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 22 |
| = | = | Aluminum & its alloys  -----------  Manufacturing processes | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 23 |
| = | = | Copper & its alloys  -----------  Manufacturing processes | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 24 |
| = | = | Magnesium &its alloys  ------------  REFRACTORY’S | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 25 |
| = | = | Titanium &its alloys  -------------  REFRACTORY’S | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 26 |
| = | = | Application  ----------  REFRACTORY’S | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 27 |
| = | = | Advanced materials  ----------  Changes associated with china clays burningg | From a to I of article 10 | 3  2metalicmetal  1 non-metalic metal | 28 |
| = | = | Review  ----------  Refractories performance | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 29 |
| = | = | Review  ------------  Refractories performance | From a to I of article 10 | 3  2metalic metal  1 non-metalic metal | 30 |

|  |  |  |
| --- | --- | --- |
| ***15. Infrastructure*** | | |
| COURSE TEXTS:  1. Materials science and engineering by William D. Callister 2003  2. Elements of materials science and engineering by Lawrance .H (1989)  3. The science and design of engineering materials by Schaffar (1995)  OTHER:  Many of on line materials from the internet. | Required reading:  · CORE TEXTS  · COURSE MATERIALS  · OTHER | |
| Soft ware(industrial processing videos | Special requirements (include forexample workshops, periodicals,IT software, websites) | |
| Presentation from students. | Community-based facilities  (include for example, guest  Lectures , internship,field studies) | |
| ***16. Admissions*** | | |
| ME/10 , ME/20 , ME /30 | | Pre-requisites |
|  | | Minimum number of students |
| 45 | | Maximum number of students |
| Lecturer : SuhairGhazy Hussein  MS.cMechanical Engineering /Manufacturing &Industrial .  Mech. Engr. Dept.  College of Engineering  University of Baghdad  Tel: +00964-7901578292  Email: suhairaaffmm@yahoo.com | | ***17. Course Instructors*** |

.