

<p>Kingdom of Saudi Arabia Ministry of Higher Education Qassim University College of Engineering</p>		<p>المملكة العربية السعودية وزارة التعليم العالي جامعة القصيم كلية الهندسة</p>
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Advanced Manufacturing Processes

College: Engineering

Department: Mechanical

First: Course Definition

1- Course Code: ME 631

2- Units: 3 credit hrs

3 – Semester: MS.C

4 -Prerequisite : Manufacturing Processes

5- Co-requisite:

6- Location (if not on main Campus):

Second: Course Objectives

- 1- Provide students with an understanding of the latest technology being used in the area of Computer Aided Design and Computer Aided Manufacturing.
- 2- Allow students to use CAD packages to design samples of Jigs & Fixtures.
- 3- The student will be familiar with the basic principles of Manufacturing Systems.
- 4- Allow students to solve problems by applying lean manufacturing techniques.
- 5- Provide students with understanding of nontraditional machining processes.

Third: Course Specifications

1- Topics to be covered

Subject	No of Weeks	Units
Introduction	1	3
Jig & Fixture Design	2	6
Rapid Prototyping	2	6
Materials Review, Polymer processing / processing of composites	2	6
Mechanics of Materials Review	2	6
Metal forming, Sheet metal working, Material removal processes	2	6

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Non-traditional machining	2	6
SPC/Lean Manufacturing	2	6

2- Course components (Total hrs in the Semester)

Lecture	Exercise	Other
45	----	

3- Intended Learning Outcomes of the Course (ILO's)

a. Knowledge

i) Description of the knowledge to be acquired:

- Principle of manufacturing operations.
- How to calculate the elements of jigs and fixtures and the performance characteristics of both of them.
- Fundamentals of rapid prototyping.
- Principle of materials, polymer processing / processing of composites
- Metal forming, sheet metal working, material removal processes.
- How to determine the cutting conditions of nontraditional machining.

ii) Teaching strategies to be used to develop that knowledge

- Lectures
- Assignments, at home
- Discussions in the Class
- Case study Report (data collection, internet search, and reporting)

iii) Methods of assessment of knowledge acquired

- **Quizzes:** to assess understanding of the course knowledge.
- **Assignment reports:** to assess ability to answer some comprehensive questions.
- **Midterm Exams:** to assess understanding of the course knowledge.
- **Final Exam:** to assess understanding of the course knowledge.

b- Cognitive (Intellectual) Skills

i) Cognitive skills to be developed

- The ability to analyze, and determine the jigs & fixtures performance characteristics.
- The ability to select the suitable materials according to the application and process.
- The ability to control the cutting conditions in traditional and nontraditional machining.

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<p>ii) Teaching strategies to be used to develop these cognitive skills</p> <ul style="list-style-type: none"> • Lectures • Assignments, at home • Discussions in the Class • Case study Report (data collection, Internet search, and reporting) <p>iii) Methods of assessment of students cognitive skills</p>
<ul style="list-style-type: none"> • Quizzes: to assess the ability to solve quickly some problems. • Assignment reports: to assess the ability to solve and analyze some comprehensive problems. • Midterm Exams: to assess the ability to discuss, analyze, and solve the associated problems. • Final Exam: to assess the intellectual skills such as analytical skills and ability to solve machine problems.

c. Interpersonal Skills and Responsibility

<p>i) Description of the interpersonal skills and capacity to carry responsibility to be developed</p> <ul style="list-style-type: none"> • Team work • Ideas development and sharing with others
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<p>ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> • Assignments, at home • Discussions in the Class • Case study Report (data collection, Internet search, and reporting) <p>iii) Methods of assessment of students interpersonal skills and capacity to carry responsibility</p> <ul style="list-style-type: none"> - Unified reports and Seminars: to assess the integration done by the student in a unified report and presentations. - Oral Group Exams: to assess interactive and communication abilities.
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d. Communication, Information Technology and Numerical Skills

<p>i) Description of the skills to be developed in this domain</p> <ul style="list-style-type: none"> • Use of the internet search • Technical report writing
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<p>ii) Teaching strategies to be used to develop these skills</p> <ul style="list-style-type: none"> • Assignments, at home • Assignment Reports (data collection, Internet search, and reporting)

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iii) Methods of assessment of students numerical and communication skills

- **Assignment Reports:** to assess technical report writing abilities.
- **Discussion Groups:** to assess interactive and communication abilities.

e. Psychomotor (if applicable) & Other Non-cognitive Skills

i) Description of the psychomotor or other skills to be developed and the level of performance required

Not applicable

ii) Teaching strategies to be used to develop these skills-

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iii) Methods of assessment of student's psychomotor skills

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4- Student Assessment Schedule

Serial	Assessment tool (test, group project, examination etc.)	Week due	Weight
1	Quiz 1	Week 2	2%
2	Assignment 1	Week 4	2%
3	Quiz 2	Week 4	2%
4	Quiz 3	Week 5	2%
5	Mid Term Exam1	Week 6	15%
6	Quiz 4	Week 8	2%
7	Quiz 5	Week 9	2%
8	Mid Term Exam2	Week 12	15%
9	Assignment 2	Week 13	2%
10	Continuous class evaluation	1st -15th	2%
11	Group reports and seminars	Week 13	2%
12	Attendance	1st -15th	2%
13	Final Exam	Week 16	50%

5- Student Support

6 Office hours per week are offered by the instructor to aid the students and support them.

6- Learning Resources

i) Essential Books (References)

- [1] Kalpakjian, *Manufacturing Processes for Engineering Materials*, Wiley, 4th Ed., 2008.
[2] E. Paul DeGarmo, *Materials and Processes in Manufacturing*, Prentice Hall, 8th Ed., 1997.[3] Mikell P. Groover, *Fundamentals of Modern Manufacturing*, 2nd Ed, Prentice-Hall, 2002

ii) Course Notes

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7- Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching

- Questionnaire,
- Observing the students opinions recorded in the college student site
- Appeal box
- Carrying out extensive questioners by a sample of the distinguished students just after the graduation from the college.

2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department

- Periodical review of the teaching methods by both the department council and the education affairs vice dean.-
- Questionnaire,
- Observing the students opinions recorded in the college student site
- Appeal box

3 Processes for Improvement of Teaching

- Evaluation of the course outlines by external staff member from outside the university
- Periodical contact with the different engineering authorities and industries for evaluating and getting their feedback and suggestions concerning the course outlines.

4. Processes for Verifying Standards of Student Achievement

It is planned to:

- Check marking of a sample of student work by an independent faculty member.
- Exchange periodically, and remark a sample of assignments with a faculty member in King Saud University (KSU).

5. The planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Assessment and evaluation of the level of achieving the course outcomes through a continuous improvement process (part of a quality assurance system established by the university),
- Consequently, actions are to be taken to improve the course delivery when necessary.
- Review of the course objectives, outcomes and curriculum each 2 years.