



## 8. Course Specification of Engineering Workshop

<b>I. Course Identification and General Information:</b>						
1.	Course Title:	Engineering Workshop.				
2.	Course Code & Number:	BR002.				
3.	Credit hours:	C.H				TOTAL CR. HRS.
		Th.	Seminar/Tu.	Pr	Tr.	
		2	-	2	-	
4.	Study level/ semester at which this course is offered:	First Year - Second Semester.				
5.	Pre –requisite (if any):	None.				
6.	Co –requisite (if any):	None.				
7.	Program (s) in which the course is offered:	Mechanical Engineering Program.				
8.	Language of teaching the course:	English Language.				
9.	Location of teaching the course:	Faculty of Engineering				
10.	Prepared By:	Asst. Prof. Dr. Abdulsalam Almakhlafy				
11.	Date of Approval:					

<b>II. Course Description:</b>
<p>Engineering workshop is an <b>introduction</b> to the principles of manufacturing process. The knowledge of manufacturing practices is highly essential for all engineers for familiarizing themselves with modern concepts of manufacturing technologies. The basic need is to provide theoretical and practical knowledge of manufacturing processes and workshop technology to all the engineering students. The student will be taught the workshops layout, Measurement instruments, Carpentry tools, Engineering materials, Metal machining, Joining of materials, Sheet metal work, Metal forming; Bench work and filling, Foundry and pattern making.</p>

	<b>III. Alignment Course Intended learning outcomes (CILOs) of the course</b>	<b>Referenced PILOs</b>
a1	Characterize knowledge of the different manufacturing processes definitions, concepts; formulas, characteristics, and capabilities.	A1

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<b>a2</b>	Classify the engineering materials and their properties and applications.	A2
<b>a3</b>	Recognize about workshops layout, functions, equipment, and the necessary safety considerations.	A3
<b>a4</b>	Recognize about measurement tests and measuring tools.	A4
<b>b1</b>	Explore skills in carryout measurement tests using the measuring tools and within use of hand tools and workshop equipment.	B1
<b>b2</b>	Differentiate between various materials for their applications.	B2
<b>c1</b>	Apply appropriate techniques, skills, and modern engineering tools necessary for Mechanical engineering practices.	C1
<b>c2</b>	Implement accurate measurements using simple measuring tools.	C3
<b>d1</b>	Cooperate in stressful environment and within constraints.	D1
<b>d2</b>	Estimate the needs to engage in life- long learning, and achieving effectively self-development.	D3

<b>(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1-</b> Characterize knowledge of the different manufacturing processes definitions, concepts; formulas, characteristics, and capabilities.	Lectures, tutorials laboratory, seminars	Examinations, laboratory reports, homework presentations
<b>a2-</b> Classify the engineering materials and their properties and applications.	Lectures, tutorials, laboratory, seminars, projects	Examinations, laboratory reports, homework presentations, individual and group project reports.
<b>a3-</b> Recognize about workshops layout, functions, equipment, and the necessary safety considerations.	Lectures, tutorials, Seminars, projects.	Examinations, homework presentations, individual and group project reports
<b>a4-</b> Recognize about measurement tests and measuring tools.	Lectures, tutorials, Seminars, projects.	Examinations, homework presentations, individual and group project reports

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**(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1-</b> Explore skills in carryout measurement tests using the measuring tools and within use of hand tools and workshop equipment.	Lectures, tutorials, laboratory, seminars, projects	Examinations, homework, laboratory reports presentations, individual and group project reports
<b>b2-</b> Differentiate between various materials for their applications.	Lectures, tutorials, laboratory, seminars, projects	Examinations, homework, laboratory reports presentations, individual and group project reports

**(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1-</b> Apply appropriate techniques, skills, and modern engineering tools necessary for Mechanical engineering practices.	Lectures, laboratory, seminars, projects , small group	Examinations, laboratory reports, presentations, individual and group project reports.
<b>c2-</b> Implement accurate measurements using simple measuring tools.	tutorials, laboratory, seminars, projects, small group	Examinations, laboratory reports, presentations, individual and group project reports.

**(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
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<b>d1-</b>	Cooperate in stressful environment and within constraints.	laboratory, seminars, projects, small group	Presentations, Reports
<b>d2-</b>	Estimate the needs to engage in life- long learning, and achieving effectively self-development.	Seminars, assignments, projects.	Presentations, Reports

<b>IV. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/Topics List</b>	<b>Learning Outcomes</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>Contact hours</b>
1.	Introduction to Principles of Production.	a1	Course specifications and plan Production process Plant layout Types of layout	1	2
2.	Industrial Safety.	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	objectives of industrial safety The accidents, Types of accidents, Cause of accidents common safety methods	1	2
3.	Measurements Devices.	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	Types of measurement tools. Length and depth measurements, Outside and inside diameters, Angle measurements, Accuracy.	1	2
4.	Engineering Materials.	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	Metallic Materials Ferrous, Steels, Plain,Carbon Alloy, Cast iron, Grey, White, Malleable, Ductile, Nodular, Non-ferrous	2	4

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			Aluminum, Copper, Magnesium, Tin, Zinc, Lead Nickel and their alloys Non-metallic Materials Organic Plastics, Wood Paper Rubber Leather, Petroleum Inorganic, Minerals Cement Glass, Ceramics, Graphite		
5.	Properties of an Engineering Material and Test of Metals.	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	Physical properties, Chemical properties, Thermal properties, Electrical properties, Magnetic properties, Optical properties, and, Mechanical properties	1	2
6.	Bench Work and Fitting.	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	Tools used in bench and fitting shop	1	2
7.	Mid- Term Exam.	a1,a2,a3,a4,b1,b2, c1,c2	The First 6 Chapters.	1	2
8.	Carpentry Shop.	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	Marking tools, measuring devices, Measuring instruments. Supporting tools Holding tools. Striking tools Cutting tools. Tightening tools, and, Miscellaneous tools	1	2
9.	Sheet Metal Work.	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	Metals used in sheet metal work. Sheet metal tool. Folding terminology of sheet metal joint. Sheet metal operations. Development of Pattern layout. Machines	1	2

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			used in sheet metal shop. Type of presses.		
10.	Metal Forming.	a1,a2,a3,a4,b 1,b2, c1,c2,d1,d2	Casting process, forging process, hot and working of metal	1	2
11.	Joining of Materials.	a1,a2,a3,a4,b 1,b2, c1,c2,d1,d2	Permanent and temporary joined	1	2
12.	Foundry and Pattern Making.	a1,a2,a3,a4,b 1,b2, c1,c2,d1,d2	Hand tools in boundary shop. The common flasks Power operated foundry equipment	2	4
13.	Machining Fundamentals	a1,a2,a3,a4,b 1,b2, c1,c2,d1,d2	Lathe machine, milling machine, drilling machine, Shaping and slotting machine	1	2
14.	Final Exam.	a1,a2,a3,a4,b 1,b2, c1,c2	All the Chapters.	1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

<b>B - Practical Aspect:</b>				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
1	Industrial Safety	1	2	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2
2	Measurements Devices.	1	2	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2
3	Bench Work and Fitting.	1	2	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2
4	Carpentry Shop.	1	2	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2
5	Sheet Metal Work.	1	2	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2

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6	Joining of Materials (Welding).	1	2	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2
7	Machining Fundamentals	1	2	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2
<b>Number of Weeks /and Units Per Semester</b>		<b>7</b>	<b>14</b>	

### V. Teaching strategies of the course:

Lectures, Laboratory, Workshop, Seminars, Projects, Small Group.  
 Examinations, Laboratory Reports, Presentations, Individual and Group Project Reports.

### VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Workshop Practice1	a1-d2	4	5
2.	Workshop Practice2	a1-d2	5	5
3.	Workshop Practice3	a1-d2	6	5
4.	Workshop Practice4	a1-d2	7	5
5.	Workshop Practice5	a1-d2	8	5
6.	Workshop Practice6	a1-d2	9	5
7.	Workshop Practice7	a1-d2	10	5
8.	Practice report	a1-d2	10	10
<b>Total</b>				<b>45</b>

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VII. 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.	12	45	30 %	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2
2	Final Exam Lab.	12	30	20 %	a1,a2,a3,a4,b1,b2, c1,c2
3	Final Exam	16	75	50 %	a1,a2,a3,a4,b1,b2, c1,c2
4	<b>Total</b>		<b>150</b>	<b>100 %</b>	

VIII. Learning Resources:	
<ul style="list-style-type: none"> <li>Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).</li> </ul>	
<b>1- Required Textbook(s) (maximum two ).</b>	
	1- R. Singh, 2006, "Introduction to Basic Manufacturing Processes and Workshop Technology", New Age International Publishers. 2- Dr. Sir M. Visveswaraiah, 2008, Workshop Practice Manual., Sixth Edition, BS Publications.
<b>2- Essential References.</b>	
	1. Bruce J. Black, 1984, "Workshop Processes, Practices and Materials", Publisher: Edward Arnold, London. 2. Kannaiah, P., and Narayanan, K. C., 1999, Manual on Workshop Practice, Scitech Publications, Chennai.
<b>3- Electronic Materials and Web Sites etc.</b>	
	1- <a href="http://www.tcd.ie">www.tcd.ie</a> . 2- <a href="http://www.empa.ch">www.empa.ch</a> . 3- <a href="http://www.dcu.ie">www.dcu.ie</a> .

IX. Course Policies:	
1.	<b>Class Attendance:</b> -A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring <b>an approved</b> statement from university Clinic

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2.	<p><b>Tardy:</b></p> <p>- For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.</p>
3.	<p><b>Exam Attendance/Punctuality:</b></p> <p>- A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam.</p>
4.	<p><b>Assignments &amp; Projects:</b></p> <p>- The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.</p>
5.	<p><b>Cheating:</b></p> <p>- For cheating in exam, a student will be considered as <b>failure</b>. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty.</p>
6.	<p><b>Plagiarism:</b></p> <p>Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee <b>proved</b> a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.</p>
7.	<p><b>Other policies:</b></p> <ul style="list-style-type: none"> <li>- Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room</li> <li>- Mobile phones are not allowed in class during the examination.</li> </ul> <p>Lecture notes and assignments my given directly to students using soft or hard copy</p>

Reviewed By	<p><b><u>Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat</u></b></p> <p><b><u>President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi</u></b></p> <p><b><u>Name of Reviewer from the Department: Assoc. Prof. Dr. Riyad Muharam</u></b></p>
	<p><b><u>Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa</u></b></p> <p><b><u>Assoc. Prof. Dr. Ahmed Mujahed</u></b></p> <p><b><u>Asst. Prof. Dr. Munasar Alsubri</u></b></p>

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## 8. Course Plan of Engineering Workshop

Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Asst. Prof. Dr. Abdulsalam Almakhlafy	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		SAT	SUN	MON	TUE	WED	THU
<b>E-mail</b>							

II. Course Identification and General Information:						
1.	Course Title:	Engineering Workshop.				
2.	Course Number & Code:	BR002.				
3.	Credit hours:	C.H				Total Cr. Hrs.
		Th.	Seminar/Tu.	Pr	Tr.	
		2	-	2	-	
4.	Study level/year at which this course is offered:	First Year - Second Semester.				
5.	Pre –requisite (if any):	None.				
6.	Co –requisite (if any):	None.				
7.	Program (s) in which the course is offered	Mechanical Engineering Program.				
8.	Language of teaching the course:	English Language.				
9.	System of Study:	Semesters.				
10.	Mode of delivery:	Lectures and Practical.				
11.	Location of teaching the course:	Faculty of Engineering.				

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### III. Course Description:

Engineering workshop is an **introduction** to the principles of manufacturing process. The knowledge of manufacturing practices is highly essential for all engineers for familiarizing themselves with modern concepts of manufacturing technologies. The basic need is to provide theoretical and practical knowledge of manufacturing processes and workshop technology to all the engineering students. The student will be taught the workshops layout, Measurement instruments, Carpentry tools, Engineering materials, Metal machining, joining of materials, Sheet metal work, Metal forming; Bench work and filling, Foundry and pattern making.

### IV. Intended learning outcomes (ILOs) of the course:

<ul style="list-style-type: none"> <li>Brief summary of the knowledge or skill the course is intended to develop:</li> </ul>	
a1	Characterize knowledge of the different manufacturing processes definitions, concepts, formulas, characteristics, and capabilities.
a2	Classify the engineering materials and their properties and applications.
a3	Recognize about workshops layout, functions, equipment, and the necessary safety considerations.
a4	Recognize about measurement tests and measuring tools.
b1	Explore skills in carryout measurement tests using the measuring tools and within use of hand tools and workshop equipment.
b2	Differentiate between various materials for their applications.
c1	Apply appropriate techniques, skills, and modern engineering tools necessary for Mechanical engineering practices.
c2	Implement accurate measurements using simple measuring tools.
d1	Cooperate in stressful environment and within constraints.
d2	Estimate the needs to engage in life- long learning, and achieving effectively self-development.

### V. Course Content:

- Distribution of Semester Weekly Plan of Course Topics/Items and Activities.

#### A – Theoretical Aspect:

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Order	Topics List	Sub Topics	Week Due	Contact Hours
1.	Introduction to Principles of Production.	Course specifications and plane Production process Plant layout Types of layout	1 <sup>st</sup>	2
2.	Industrial Safety.	objectives of industrial safety The accidents, Types of accidents, Cause of accidents common safety methods	2 <sup>nd</sup>	2
3.	Measurements Devices.	Types of measurement tools. Length and depth measurements, Outside and inside diameters, Angle measurements, Accuracy.	3 <sup>rd</sup>	2
4.	Engineering Materials.	Metallic Materials Ferrous, Steels, Plain, Carbon Alloy, Cast iron, Grey, White, Malleable, Ductile, Nodular, Non-ferrous Aluminum, Copper, Magnesium, Tin, Zinc, Lead Nickel and their alloys Non-metallic Materials Organic Plastics, Wood Paper Rubber Leather, Petroleum Inorganic, Minerals Cement Glass, Ceramics, Graphite	4 <sup>th</sup> and 5 <sup>th</sup>	4
5.	Properties of an Engineering Material and Test of Metals.	Physical properties, Chemical properties, Thermal properties, Electrical properties, Magnetic properties, Optical properties, and, Mechanical properties	6 <sup>th</sup>	2
6.	Bench Work and Fitting.	Tools used in bench and fitting shop	7 <sup>th</sup>	2
7.	Mid- Term Exam.	The First 6 Chapters.	8 <sup>th</sup>	2

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8.	Carpentry Shop.	Marking tools, measuring devices, Measuring instruments. Supporting tools Holding tools. Striking tools Cutting tools. Tightening tools, and, Miscellaneous tools	9 <sup>th</sup>	2
9.	Sheet Metal Work.	Metals used in sheet metal work. Sheet metal tool. Folding terminology of sheet metal joint. Sheet metal operations. Development of Pattern layout. Machines used in sheet metal shop. Type of presses.	10 <sup>th</sup>	2
10.	Metal Forming.	Casting process, forging process, hot and working of metal	11 <sup>th</sup> and 12 <sup>th</sup>	4
11.	Joining of Materials.	Physical properties, Chemical properties, Thermal properties, Electrical properties, Magnetic properties, Optical properties, and, Mechanical properties	13 <sup>th</sup>	2
12.	Foundry and Pattern Making.	Permanent and temporary joined	14 <sup>th</sup>	2
13.	Machining Fundamentals	Hand tools in boundary shop. The common flasks Power operated foundry equipment	15 <sup>th</sup>	2
14.	Final Exam.	All the Chapters.	16 <sup>th</sup>	2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>

<b>B – Practical Aspect:</b>			
<b>Order</b>	<b>Topics List</b>	<b>Week Due</b>	<b>Contact Hours</b>
1	Industrial Safety.	4 <sup>th</sup>	2
2	Measurements Devices.	5 <sup>th</sup>	2
3	Bench Work and Fitting.	6 <sup>th</sup>	2
4	Carpentry Shop.	7 <sup>th</sup>	2

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5	Sheet Metal Work.	8 <sup>th</sup>	2
6	Joining of Materials (Welding).	9 <sup>th</sup>	2
7	Machining Fundamentals	10 <sup>th</sup>	2
<b>Number of Weeks /and Units Per Semester</b>		<b>7</b>	<b>14</b>

### VI. Teaching strategies of the course:

Lectures, Laboratory, Seminars, Projects, Small Group.  
 Examinations, Laboratory Reports, Presentations, Individual and Group Project Reports.

### VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Workshop Practice1	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	4	3
2.	Workshop Practice2	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	5	5
3.	Workshop Practice3	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	6	5
4.	Workshop Practice4	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	7	5
5.	Workshop Practice5	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	8	5
6.	Workshop Practice6	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	9	5
7.	Workshop Practice7	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	10	5
8.	Practice report	a1,a2,a3,a4,b1,b2, c1,c2,d1,d2	10	10
<b>Total</b>				<b>45</b>

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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	12	45	30 %	a1, d2
2.	Final exam lab.	12	30	20 %	a1, d2
3.	Final Exam	16	75	50 %	a1, d2
			<b>150</b>	<b>100 %</b>	

IX. Learning Resources:	
<ul style="list-style-type: none"> <li>Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).</li> </ul>	
<b>1- Required Textbook(s) (maximum two ).</b>	
	1- R. Singh, 2006, "Introduction to Basic Manufacturing Processes and Work Technology", New Age International Publishers. 2- Dr. Sir M. Visveswaraiyah, 2008, Workshop Practice Manual., Sixth Edition Publications.
<b>2- Essential References.</b>	
	1. Bruce J. Black, 1984, "Workshop Processes, Practices and Materials", Publisher: Edward Arnold, London. 2. Kannaiah, P., and Narayanan, K. C., 1999, Manual on Workshop Practice, Scitech Publications, Chennai.
<b>3- Electronic Materials and Web Sites etc.</b>	
	1. <a href="http://www.tcd.ie">www.tcd.ie</a> . 2. <a href="http://www.empa.ch">www.empa.ch</a> . 3. <a href="http://www.dcu.ie">www.dcu.ie</a> .

X. Course Policies:	
1.	<b>Class Attendance:</b> -A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring <b>an approved</b> statement from university Clinic

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2.	<p><b>Tardy:</b></p> <ul style="list-style-type: none"> <li>- For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.</li> </ul>
3.	<p><b>Exam Attendance/Punctuality:</b></p> <ul style="list-style-type: none"> <li>- A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam.</li> </ul>
4.	<p><b>Assignments &amp; Projects:</b></p> <ul style="list-style-type: none"> <li>- The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time.</li> </ul>
5.	<p><b>Cheating:</b></p> <ul style="list-style-type: none"> <li>- For cheating in exam, a student will be considered as fail. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty.</li> </ul>
6.	<p><b>Plagiarism:</b></p> <p>Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee <b>proved</b> a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.</p>
7.	<p><b>Other policies:</b></p> <ul style="list-style-type: none"> <li>- Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room</li> <li>- Mobile phones are not allowed in class during the examination.</li> </ul> <p>Lecture notes and assignments my given directly to students using soft or hard copy</p>

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