5 Course Specification of Workshop Technology

I. Course Identification and General Information:							
1	**Course Title:**	***Workshop Technology***					
2	**Course Code & Number:**	BR004					
3	**Credit hours:**	C.H					**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**		
		1		4			3
4	**Study level/ semester at which this course is offered:**	1st Level/ 1st semester					
5	**Pre –requisite (if any):**	None					
6	**Co –requisite (if any):**	----------					
8	**Program (s) in which the course is offered:**	Civil engineering					
9	**Language of teaching the course:**	English+ Arabic					
10	**Location of teaching the course:**	Class room-workshop					
11	**Prepared By:**	Dr. Mohammad A. Algorafi					
12	**Date of Approval**						

II. Course Description:

This course introduces principles of production, Function and planning of workshop, Industrial safety, Measurements, electrical circuits and its installation, Carpentry tools, Engineering materials, Metal machining, Joining of materials, Sheet metal work, Metal forming; Bench work and filling, Foundry and pattern making.

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

III. Course Intended learning outcomes (CILOs) of the course		Reference PILOs
a.1	Define about measurement tests and measuring tools.	**A1**
a.2	Define the various wood working tools and their operations and applications.	**A3**
a.3	List the engineering materials and their properties and applications.	**A4**
b.1	Suggest the appropriate solutions for engineering problems based on analytical thinking	**B1**
b.2	Demonstrate skills in carryout measurement tests using the measuring tools and within use of hand tools and workshop equipment.	**B2**
b.3	Differentiate between different materials using different studied practical methods	**B3**
c.1	Use the appropriate techniques, skills, and modern engineering tools necessary for engineering practice.	**C2**
c.2	Use of proper materials, tools, equipment and machines to weld, fabricate, and do simple machining work.	**C1**
c.3	Apply the experience and Hands skills on different trades of engineering like fitting, carpentry, machining, welding, and sheet metal.	**C4**
d.1	Work effectively as a member in a multi-disciplinary team.	**D1**

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Define about measurement tests and measuring tools.	Lectures & Examples Problems Class attendance & participation Projects & Carryout Practical workshop Activities	Homework Quizzes Major Exams Presentation & Reports Practical assessment Participation
a2- Define the various wood working tools and their operations and applications.		
a3- List the engineering materials and their properties and applications.		

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Suggest the appropriate solutions for engineering problems based on analytical thinking	Lectures & Class activity Workshop Practical Activities Presentation & Reports Single/Groups Practical Activities Workshop Practical	Homework Quizzes Major Exams Problem Sets Participation Reports
b2- Demonstrate skills in carryout measurement tests using the measuring tools and within use of hand tools and workshop equipment.		
b3- Differentiate between different materials using different studied practical methods		

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
c1- Use the appropriate techniques, skills, and modern engineering tools necessary for engineering practice.	Lectures & Class activity Workshop Practical Activities Presentation & Reports Single/Groups Practical Activities Workshop Practical	Homework Quizzes Major Exams Problem Sets participation Reports
c2- Use of proper materials, tools, equipment and machines to weld, fabricate, and do simple machining work.		
c3- Apply the experience and Hands skills on different trades of engineering like fitting, carpentry, machining, welding, and sheet metal.		

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Work effectively as a member in a multi-disciplinary team.	Single/Groups Practical Activities	Reports & participation

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

	Workshop Practical Assignments	

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Introduction to principles of production	A3, b1, b3, c1, c2, c3	- Introduction - Manufacturing Engineering - production Process - Manufacturing Processes - Plant and Shop Layout - Objectives of Good Plant Layout	1	1
2	Measurements	a1, b1, b2	- Measuring equipment (ruler, Vernier instruments, Micrometers, caliper) - Angular measurements (protractor, Vernier protractor, sine bar).	1	1
3	Electrical Shop	a2, a1, b1, c1, c2, c3, d1	- Dial indicators - Modern measuring techniques. - Direct and alternating current, Electric hazards, Electrical workshop instruments and tools,	1	1
4	Carpentry shop	a2, a3, b1, c1, c2, c3, d1	- Introduction - Common tools used in carpentry, Marking and Measuring, Holding and Supporting, Cutting, 4- Striking, and Miscellaneous Tools) - Carpentry Processes - Main Carpentry machines	2	2

			(Wood Working Lathe, Circular Saw, Band Saw)		
5	Engineering materials	a2, b1, b3, c1, c2, c3,	- Introduction - Classification of engineering materials. - Mechanical and manufacturing properties. - Applications of engineering materials.	1	1
6	Machining Fundaments	a2, b1, c1, c2, c3, d1	- Introduction - Machining processes and equipment (lathe, milling, drilling and shaper machine)	2	2
7	Joining of materials	b1, c1, c2, c3, d1	- Classification of material joining. - Mechanical fasteners - Soldering and Brazing - Welding - Adhesive bonding	2	2
8	Sheet Metal Work	b1, c1, c2, c3, d1	- Sheet metal working - Metal used in sheet metal working - Sheet metal hand tools - Sheet metal operations - Sheet metal joints - Sheet metal working machines	1	1
9	Metal forming	b1, c1, c2, c3, d1	- Bulk metal forming concepts and equipment (Forging, rolling, extrusion and wire drawing) - Hot and cold forming	1	1
10	Bench work and fitting	b1, c1, c2, c3, d1	- Concept of Bench work and fitting. - Tools used	1	1
11	Foundry and pattern making		- Foundry process - Advantages and disadvantages - Molds types and making.	1	1

Number of Weeks /and Units Per Semester	**14**	**14**

B - Practical Aspect:				
Order	**Tasks/ Experiments**	**Number of Weeks**	**contact hours**	**Learning Outcomes**
1	Measurements & safety tools	**2**	**8**	a1, b1, b2
2	Electrical Shop	**1**	**4**	a3, b1, c1, c2, c3, d1
3	Carpentry shop	**2**	**8**	a2, a3, b1, c1,c2, c3, d1
4	Machining shop	**2**	**8**	a1, b1, c1,c2, c3, d1
5	Welding shop	**2**	**8**	b1, c1, c2, c3, d1
6	sheet metal work	**1**	**4**	b1, c1,c2, c3, d1
7	Metal forming	**1**	**4**	b1, c1,c2, c3, d1
8	Bench work and filling	**1**	**4**	b1, c1,c2, c3, d1
9	Foundry and pattern making	**2**	**8**	b1, c1,c2, c3, d1
Number of Weeks /and Units Per Semester		**14**	**56**	

V. Teaching strategies of the course:

Lectures & Examples
Problems
Class attendance & participation
Projects & Carryout Practical workshop activities

VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Measurements & safety tools	a1, a2, b1, b2	2	0.75
2	Electrical Shop	b1, c1, c2, c3, d1	3	0.75
3	Carpentry shop	a2, b1, c1, c2, c3, d1	5	0.75
4	Machining shop	a1, b1, c1, c2, c3, d1	7	0.75
5	Welding shop	b1, c1, c2, c3, d1	9	0.75
6	sheet metal work	b1, c1, c2, c3, d1	10	0.75
7	Metal forming	b1, c1, c2, c3, d1	11	0.75

Prepared by — Head of Department: Dr. Abdulkareem Yahya Al khattabi

Quality Assurance Unit: Ass. Prof. Dr. Mohammad Algorafi

Dean of the Faculty: Prof. Dr. Mohammed AL-Bukhaiti

Academic Development Center & Quality Assurance: Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

8	Bench work and filling	b1, c1, c2, c3, d1	12	0.75
9	Foundry and pattern making	b1, c1, c2, c3, d1	14	1.5

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	Practical assessments	2, 7, 10, 14	7.5	5	a1, a2, a3, b1, b2, b3, c1, c2, c3, d1
2	Project reports	2, 5, 7, 9, 10, 11, 12, 14	7.5	5	
3	Quizzes.	Three time randomly	7.5	5	
4	Mid-term exam.	7th	15	10	a1, a2, a3, b1, b2, b3, c1, c2, c3, d1
5	Final-exam.	13	90	60	a1, a2, a3 b1, b2, b3, c1, c2, c3, d1
6	Project	7	22.5	15	b2, c1, c2, c3, d1
	Sum		**150**	**100%**	

VIII. Learning Resources:

- Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two).

1. Course notes prepared by instructor and power point presentations
2. R. Singh, "Introduction to Basic Manufacturing Processes and Workshop Technology", New Age International Publishers, 2006.

2- Essential References.

1. Bruce J. Black, "Workshop Processes, Practices and Materials", Publisher: Edward Arnold, London 1984.
2. Kannaiah, P., and Narayanan, K. C., Manual on Workshop Practice, Scitech Publications, Chennai, 1999.
3. K. Venkata Reddy, "Workshop Practice Manual", Sixth edition, 2011 print, BS Publications, Hyderabad.

3- Electronic Materials and Web Sites *etc.*

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

IX. Course Policies:	
1	Class Attendance: The students should have more than 75 % of attendance according to rules and regulations of the faculty.
2	Tardy: The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.
3	Exam Attendance/Punctuality: The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for midterm exam and final exam.
4	Assignments & Projects: The assignment is given to the students after each chapter, the student has to submit all the assignments for checking on time.
5	Cheating: If any cheating occurred during the examination, the student is not allowed to continue and he/she has to face the examination committee for enquiries.
6	Plagiarism: The student will be terminated from the Faculty, if one student attends the exam on another behalf according to the policy, rules and regulations of the university.
7	Other policies: -All the teaching materials should be kept out the examination hall. -The mobile phone is not allowed. -There should be a respect between the student and his teacher.

Reviewed By	**Vice Dean for Academic Affairs and Post Graduate Studies** **Dr. Tarek A. Barakat** **Dr. Riyad A. Muharam**
	Deputy Rector for Academic Affairs Dr. Ibrahim AlMutaa **Dr. Ahmed mujahed** **Dr. Munaser Alsubri**

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

Template for Course Plan (Syllabus) of Workshop Technology

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	**Dr. Mohammad Algorafi**	**Office Hours**					
Location& Telephone No.		**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail				8-10			

II. Course Identification and General Information:						
1	**Course Title:**	***Workshop Technology***				
2-	**Course Number & Code:**	BR004				
3-	**Credit hours:**	**C.H**				**Credit Hours**
		Th.	**Tu**	**Pr**	**Tr.**	
		1		4		3
4-	**Study level/year at which this course is offered:**	1st Level/ 1st semester				
5-	**Pre –requisite (if any):**	None				
6-	**Co –requisite (if any):**	----------				
7-	**Program (s) in which the course is offered**	Civil Engineering				
8-	**Language of teaching the course:**	English+ Arabic				
9-	**System of Study:**	Regular				
10-	**Mode of delivery:**	Lecture				
11-	**Location of teaching the course:**	Class room-workshop				

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

III. Course Description:

This course introduces principles of production, Function and planning of workshop, Industrial safety, Measurements, electrical circuits and its installation, 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:

- Brief summary of the knowledge or skill the course is intended to develop:

a.1 Define about measurement tests and measuring tools. A1
a.2 Define the various wood working tools and their operations and applications. A3
a.3 List the engineering materials and their properties and applications. A4
b.1 Suggest the appropriate solutions for engineering problems based on analytical thinking B1
b.2 Demonstrate skills in carryout measurement tests using the measuring tools and within use of hand tools and workshop equipment. B2
b.3 differentiate between different materials using different studied practical methods B3
c.1 Use the appropriate techniques, skills, and modern engineering tools necessary for engineering practice. C2
c.2 Use of proper materials, tools, equipment and machines to weld, fabricate, and do simple machining work. C1
c.3 Apply the experience and Hands skills on different trades of engineering like fitting, carpentry, machining, welding, and sheet metal. C4
d.1 Work effectively as a member in a multi-disciplinary team. D1

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

V. Course Content:

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

A – Theoretical Aspect:

Order	Topics List	Sub Topics List	Week Due	Contact Hours
1	Introduction to principles of production	- Introduction - Manufacturing Engineering - production Process - Manufacturing Processes - Plant and Shop Layout - Objectives of Good Plant Layout	1	1
2	Measurements	- Measuring equipment (ruler, Vernier instruments, Micrometers, caliper) - Angular measurements (protractor, Vernier protractor, sine bar).	2	2
3	Electrical Shop	- Dial indicators - Modern measuring techniques. - Direct and alternating current, Electric hazards, Electrical workshop instruments and tools,	3	1
4	Carpentry shop	- Introduction - Common tools used in carpentry, Marking and Measuring, Holding and Supporting, Cutting, 4- Striking, and Miscellaneous Tools) - Carpentry Processes - Main Carpentry machines (Wood Working Lathe, Circular Saw, Band Saw)	4,5	2
5	Engineering materials	- Introduction - Classification of engineering materials. - Mechanical and manufacturing properties. - Applications of engineering materials.	6	1

6	Machining Fundaments	- Introduction - Machining processes and equipment (lathe, milling, drilling and shaper machine)	7,8	2
7	Midterm Exam		9	1
8	Joining of materials	- Classification of material joining. - Mechanical fasteners - Soldering and Brazing - Welding - Adhesive bonding	10,11	2
9	sheet metal work	- Sheet metal working - Metal used in sheet metal working - Sheet metal hand tools - Sheet metal operations - Sheet metal joints - Sheet metal working machines	12	1
10	Metal forming	- Bulk metal forming concepts and equipment (Forging, rolling, extrusion and wire drawing) - Hot and cold forming	13	1
11	Bench work and fitting	- Concept of Bench work and fitting. - Tools used	14	1
12	Foundry and pattern making	- Foundry process - Advantages and disadvantages - Molds types and making.	15	1
13	Final Exam		16	1
Number of Weeks /and Units Per Semester			**16**	**16**

B – Practical Aspect:			
Order	**Topics List**	**Week Due**	**Contact Hours**
1	Measurements & safety tools	**1,2**	**8**
2	Electrical Shop	**3**	**4**
3	Carpentry shop	**4,5**	**8**
4	Machining shop	**6,7**	**8**
5	Welding shop	**8,9**	**8**
6	sheet metal work	**10**	**4**
7	Metal forming	**11**	**4**
8	Bench work and filling	**12**	**4**
9	Foundry and pattern making	**13,14**	**8**
Number of Weeks /and Units Per Semester		**14**	**56**

VI. Teaching strategies of the course:

Lectures & Examples
Problems
Class attendance & participation
Projects & Carryout Practical workshop activities

VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Measurements & safety tools	a1, a2, b1, b2	**2**	0.75
2	Electrical Shop	b1, c1, c2, c3, d1	**3**	0.75
3	Carpentry shop	a2, b1, c1, c2, c3, d1	**5**	0.75
4	Machining shop	a1, b1, c1, c2, c3, d1	**7**	0.75
5	Welding shop	b1, c1, c2, c3, d1	**9**	0.75
6	sheet metal work	b1, c1, c2, c3, d1	**10**	0.75
7	Metal forming	b1, c1, c2, c3, d1	**11**	0.75
8	Bench work and filling	b1, c1, c2, c3, d1	**12**	0.75
9	Foundry and pattern making	b1, c1, c2, c3, d1	**14**	1.5

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

Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Practical assessments	2, 7, 10, 14	7.5	5
2	Project reports	2, 5, 7, 9, 10, 11, 12, 14	7.5	5
3	Quizzes.	Three time randomly	7.5	5
4	Mid-term exam.	7th	15	10
5	Final-exam.	13	90	60
6	Project	7	22.5	15

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

IX. Learning Resources:

- Written in the following order: (Author – Year of publication – Title – Edition – Place of publication – Publisher).

1- Required Textbook(s) (maximum two).

1- Course notes prepared by instructor and power point presentations
2- R. Singh, "Introduction to Basic Manufacturing Processes and Workshop Technology", New Age International Publishers, 2006.

2- Essential References.

4. 1 Bruce J. Black, "Workshop Processes, Practices and Materials", Publisher: Edward Arnold, London 1984.
5. Kannaiah, P., and Narayanan, K. C., Manual on Workshop Practice, Scitech Publications, Chennai, 1999.
K. Venkata Reddy, "Workshop Practice Manual", Sixth edition, 2011 print, BS Publications, Hyderabad.

3- Electronic Materials and Web Sites *etc*.

X. Course Policies:

Unless otherwise stated, the normal course administration policies and rules of the Faculty of Engineering apply. For the policy, see: ----------

1	Class Attendance: The students should have more than 75 % of attendance according to rules and regulations of the faculty.
2	Tardy: The students should respect the timing of attending the lectures. They should attend within 1 minutes from starting of the lecture.
3	Exam Attendance/Punctuality: The student should attend the exam on time. The punctuality should be implemented according to rules and regulations of the faculty for midterm exam and final exam.
4	Assignments & Projects: The assignment is given to the students after each chapter, the student has to submit all the assignments for checking on time.

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas

5	Cheating: If any cheating occurred during the examination, the student is not allowed to continue and he/she has to face the examination committee for enquiries.
6	Plagiarism: The student will be terminated from the Faculty, if one student attends the exam on another behalf according to the policy, rules and regulations of the university.
7	Other policies: -All the teaching materials should be kept out the examination hall. - The mobile phone is not allowed. -There should be a respect between the student and his teacher.

Prepared by	Head of Department	Quality Assurance Unit	Dean of the Faculty	Academic Development Center & Quality Assurance
	Dr. Abdulkareem Yahya Al khattabi	Ass. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Ass. Prof. Dr. Huda Al-Emad

Rector of Sana'a University
Prof. Dr. Al-Qassim Mohammed Abbas