25Course Specification of Surveying 2

I. Course Identification and General Information:						
1	**Course Title:**	***Surveying 2***				
2	**Course Code &Number:**	CE107				
3	**Credit hours:**	C.H				**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**	
		2	2		2	4
4	**Study level/ semester at which this course is offered:**	2nd Level/ 1st semester				
5	**Pre –requisite (if any):**	CE101				
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 + Site				
11	**Prepared By:**	Eng. Ahmed Saleh				
12	**Date of Approval**					

II. Course Description:

This importance of this course in civil engineering is that the students will be able to use theodolite device to measure distances, angles and fix horizontal curves, Identification of the surveyors used in the field of typography, especially the theodolite device. They will learn how to measure horizontal and vertical angles, how to measure distances using the theodolite and the staff, Knowledge of the measurement of tachymetry, area elevation of the tap and theodolite and the coordinates calculation, how to set unordered coordinates, Trigonometric budgeting and knowledge of curves, types, elements of curves and how to install the site

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III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a1.	Define of the basic concepts of topographic surveying, polygons, calculate missing meteorology and type of curves.	**A1**
a2.	Describe the process of the surveying by the theodolite.	**A5**
b1.	Select the appropriate device for the required work.	**B1**
b2.	analyze various types of errors during measurements and different kinds of methods for the error adjustment	**B2**
c1.	Use the Theodolite devices in field measurements.	**C1**
c2.	Apply the various surveying skills and methods to measure relative heights, Level, horizontal and vertical angles and horizontal distances.	**C2**
d1.	Engage with colleagues to draw different kinds of survey maps.	**D1**
d2.	Perform the tasks and costs entrusted to him by studying the course individually or within a team with high efficiency.	**D3**

(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 of the basic concepts of topographic surveying, polygons, calculate missing meteorology and measurements types curves.	- Lecture - Dialogue and discussion - Problem Solving	Problem set- Written exam- Written assignment
a2- Describe the process of the surveying by the theodolite.	- Lecture - Dialogue and discussion - Problem Solving	Project - Written exam- Written assignment

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	**Teaching strategies**	**Assessment Strategies**
b1- Select the appropriate device to work	- Lecture - Dialogue and discussion - Brainstorming - Problem Solving - Practical application	Participation- Written assignment-Project
b2- Analyze various types of errors during measurements and different kinds of methods for the error adjustment	- Lecture - Dialogue and discussion - Brainstorming - Problem Solving - Practical application	Participation- Written assignment-Project
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 Theodolite devices in field measurements.	- Dialogue and discussion - Brainstorming - Problem Solving - Practical application	Written report and drawing - Group work – final exam
c2- Apply the various surveying skills and methods to measure relative heights, Level, horizontal and vertical angles and distances	- Lecture and Site - Dialogue and discussion - Brainstorming - Problem Solving - Practical application	Written report and drawing - Group work

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(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Engages with colleagues to draw different kinds of survey maps	- Brainstorming - Problem Solving - Practical application	Write the project, report including calculation and drawing
d2-Performs the tasks and costs entrusted to him by studying the course individually or within with high efficiency.	- Dialogue and discussion - Brainstorming - Problem Solving - Practical application	Write the project design report including calculation and drawing

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Introduction	a1	-Introduction -Known the applet theodolite uses -Type of theodolite devices -Comparison of the type of devices	**1**	**2**
2	Theodolite polygons	a1, b2, d1	-definition of polygons -Types of polygons (closed and open) -Finding missing metrology -polygon solution	**4**	**8**
3	Trigonometric Leveling	a1, b1, b2 , d1, d2	-Definition of trigonometric levelling -Calculate trigonometric leveling -Use the trigonometric leveling to find coordinates of inaccessible points	**1**	**2**
4	Tachometric measurement	a1, b1, b2, d1, d2	-Definition of tacheometric measurement - Methods s of tachometric measurement (stadia hairs, shadow, and invar arm methods) -Set the fixed device of theodolite	**1**	**2**

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5	Tachometric measurement	a1, b1, b2, d1, d2	-Definition of tachometric measurement -Types of tachometric measurement (stadium hairs, shadows, and an arm's arm) -Set the fixed device of theodolite	**2**	**6**
6	Surveying coverage in highway	a1, b1, b2, d1, d2	-Definition of curves -Types of horizontal curves - Determination of radius of horizontal curve. -Find the geometric elements of the horizontal curve. -Methods of stake out horizontal curve -Vertical curve -Methods for selecting the vertical curve -Calculation of vertical curve elements -Methods of stake out the vertical curve	**5**	**10**
Number of Weeks /and Units Per Semester				**14**	**28**

B - Tutorial Aspect:

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Problems on correction and calculation the theodolite observations.	1	2	a1,
2	Problems for solving closed and open theodolite polygons.	1	2	a1, a2, b1, d1
3	Problems on finding incomplete observations according to the given data.	2	4	a1, a2, b1, d1
4	Problems on trigonometric levelling.	1	2	a1, a2, b1, d1
5	Problems on tacheometric measurements.	3	6	a1, a2, b1, d1
6	Problems on how to find the theodolite constant (K, C).	1	2	a1, a2, b1, b2, d1

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7	Problems on horizontal and vertical curves.	5	10	a1, a2, b1, b2, d1
Number of Weeks /and Units Per Semester		**14**	**28**	

C – Training Aspect:

Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	Training on knowing and understanding the theodolite instrument and how to set out for monitoring.	1	2	a1, c1
2	Training on using theodolite to measure horizontal and vertical angles.	1	2	b1, c1, c2, d1
3	Training on Surveying using the tape and theodolite for closed and open polygons.	1	2	b1, c1, c2. d1
4	Trigonometric levelling training.	2	4	b1, c1, c2. d1
5	Training on using theodolite for tacheometric measurement by (stadia hairs method, shadow method and invar arm method).	3	6	b1, c1, c2. d1
6	Training on how to find constants of theodolite (K, C).	1	2	b1, b2, c1, c2. d1
7	Training on how to stake out horizontal curves using different methods (tape only, tape and theodolite and two theodolites).	4	8	b1, b2, c1, c2. d1
8	Training on how to stake out vertical curves.	1	2	b1, b2, c1, c2. d1
Number of Weeks /and Units Per Semester		**14**	**28**	

V. Teaching strategies of the course:

- Lecture
- Dialogue and discussion
- Brainstorming
- Problem Solving
- Practical application

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- Projects
- Reports
- Drawing

VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Problems on correction and calculation the theodolite observations.	a1,	2	0.5
2	Problems for solving closed and open theodolite polygons.	a1, a2, b1, d1	3	0.5
3	Problems on finding incomplete observations according to the given measurements.	a1, a2, b1, d1	5	0.5
4	Problems on trigonometric levelling.	a1, a2, b1, d1	7	0.5
5	Problems on tacheometric measurements.	a1, a2, b1, d1	8	0.5
6	Problems on how to find the theodolite constant (K, C).	a1, a2, b1, b2, d1	10	0.25
7	Problems on horizontal and vertical curves.	a1, a2, b1, b2, d1	12	0.25

VII. Reports:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Report of knowing and understanding the theodolite instrument and how to prepare it for monitoring	a1, c1	1	1
2	Report of using theodolite to measure horizontal and vertical angles.	b1, c1, c2, d1	2	2
3	Report of surveying using the tape and theodolite for closed and open polygons	b1, c1, c2., d1	3	2
4	Report of Trigonometric levelling.	b1, c1, c2, d1	5	2
5	Report of tacheometric measurement using (stadia hairs method, shadow method and invar arm method).	b1, c1, c2, d1	6	2

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6	Report of finding constants of theodolite (K, C).	b1, b2, c1, c2, d1	7	2
7	Report of stake out horizontal curves using different methods (tape only, tape and theodolite and two theodolites).	b1, b2, c1, c2, d1	8	2
8	Report of stake out vertical curves.	b1, b2, c1, c2, d1	9	2

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	Tasks and Assignments	weekly	3	2%	a1,a2,b1,b2.d1
2	Quiz 1& 2	4,10	4,5	3%	a1,a2,b1,b2.d1
3	Midterm Exam	7	22.5	15%	a1,a2,b1,b2,c1,c2.d1,d2
4	Reports	weekly	15	10%	b1,b2.c1,c2d1,d2
5	Final Exam (practical + Rep.)	13	15	10%	a1,a2,b1,b2,c1,c2.d1,d2
6	Final Exam (theoretical)	14	90	60%	a1,a2,b1,b2,c1,c2.d1,d2
	sum		**150 %**	**100%**	

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- Surveying coverage of Roads, Amman 19999
2- practically Course work in the filed

2- Essential References.

	1- Fundamentals of surveying 2- Surveying
3- Electronic Materials and Web Sites *etc*.	

X. Course Policies:	
1	**Class Attendance:** - The regulations are applied, which state that a student who desires more than 25% of attending lectures is deprived of the final examination.
2	**Tardy:** - If the student is late for attending the lecture time, his degree will be deducted for each delay in the attendance grades.
3	**Exam Attendance/Punctuality:** - The student must rely on himself for exam.
4	**Assignments & Projects:** - None
5	**Cheating:** - If the student is caught cheating, he will be deprived of the exam in the subject.
6	**Plagiarism:** - In the case of student impersonation, the Vice Dean for student Affairs will be referred to the College's Student Affairs Committee the necessary action.
7	**Other policies:** - If the student dose not attend more than 75% in the process, he will be deprived of the practical exam.

Reviewed By	**Vice Dean for Academic Affairs and Post Graduate Studies** **Dr. Tarek A. Barakat** **Dr. Mohammad Algorafi** **Eng. Bashir Al-Maswari**
	Deputy Rector for Academic Affairs Dr. Ibrahim AlMutaa **Dr. Ahmed mujahed** **Dr. Munaser Alsubri**

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Template for Course Plan (Syllabus) of Surveying 2

I. Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	En. Ahmed M. Saleh	**Office Hours**						
Location &Telephone No.	Engineering Faculty	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	Saahmed299@gmail .com			8 - 12			

II. Course Identification and General Information:						
1-	**Course Title:**	***Surveying* 2**				
2-	**Course Number & Code:**	CE107				
3-	**Credit hours:**	**C.H**				**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**	
		2	2		2	4
4-	**Study level/year at which this course is offered:**	2nd grade/ 1st semester				
5-	**Pre –requisite (if any):**					
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Civil Engineering				
8-	**Language of teaching the course:**	Arabic				
9-	**System of Study:**	Regular				
10-	**Mode of delivery:**	Lecture				
11-	**Location of teaching the course:**	Class + site				

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III. Course Description:

This importance of this course in civil engineering is that the students will be able to use theodolite device to measure distances, angles and fix horizontal curves, Identification of the surveyors used in the field of typography, especially the theodolite device. They will learn how to measure horizontal and vertical angles, how to measure distances using the theodolite and the staff, Knowledge of the measurement of tachymetry, area elevation of the tap and theodolite and the coordinates calculation, how to set unordered coordinates, Trigonometric budgeting and knowledge of curves, types, elements of curves and how to install the site

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

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

a1. Define of the basic concepts of topographic surveying, polygons, calculate missing meteorology and type of curves. A1

a2. Describe the process of the surveying by the theodolite. A5

b1. Select the appropriate device for the required work. B1

b2. analyze various types of errors during measurements and different kinds of methods for the error adjustment. B2

c1. Use the Theodolite devices in field measurements. C1

c2. Apply the various surveying skills and methods to measure relative heights, Level, horizontal and vertical angles and horizontal distances. C2

d1. Engage with colleagues to draw different kinds of survey maps. D1

d2. Perform the tasks and costs entrusted to him by studying the course individually or within a team with high efficiency. D3

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	-Introduction -Known the applet theodolite uses -Type of theodolite devices -Comparison of the type of devices	1	2
2	Theodolite polygons	-definition of polygons -Types of polygons (closed and open) -Finding missing metrology -polygon solution	2,3,4,5	8
3	Trigonometric Leveling	-Definition of trigonometric levelling -Calculate trigonometric leveling -Use the trigonometric leveling to find coordinates of inaccessible points	6	2
4	Tachometric measurement	-Definition of tacheometric measurement - Methods s of tachometric measurement (stadia hairs, shadow, and invar arm methods) -Set the fixed device of theodolite	7	8
5	Midterm Exam		8	2
6	Tachometric measurement	-Definition of tachometric measurement -Types of tachometric measurement (stadium hairs, shadows, and an arm's arm) -Set the fixed device of theodolite	9,10	4
7	Surveying coverage in highway	-Definition of curves -Types of horizontal curves - Determination of radius of horizontal curve. -Find the geometric elements of the horizontal curve.	11,12,13,14,15	10

		-Methods of stake out horizontal curve -Vertical curve -Methods for selecting the vertical curve -Calculation of vertical curve elements -Methods of stake out the vertical curve		
8	Final Exam		16	2
Number of Weeks /and Units Per Semester			**16**	**32**

B - Tutorial Aspect:			
Order	**Topics List**	**Week Due**	**Contact Hours**
1	Problems on correction and calculation the theodolite observations.	1	2
2	Problems for solving closed and open theodolite polygons.	2	2
3	Problems on finding incomplete observations according to the given data.	3,4	4
4	Problems on trigonometric levelling.	5	2
5	Problems on tacheometric measurements.	6,7,8	6
6	Problems on how to find the theodolite constant (K, C).	9	2
7	Problems on horizontal and vertical curves.	10,11,12,13,14	10
Number of Weeks /and Units Per Semester		**14**	**28**

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C – Training Aspect:			
Order	**Tasks/ Experiments**	**Number of Weeks**	**contact hours**
1	Training on knowing and understanding the theodolite instrument and how to set out for monitoring.	1	2
2	Training on using theodolite to measure horizontal and vertical angles.	2	2
3	Training on Surveying using the tape and theodolite for closed and open polygons.	3	2
4	Trigonometric levelling training.	4,5	4
5	Training on using theodolite for tacheometric measurement by (stadia hairs method, shadow method and invar arm method).	6,7,8	6
6	Training on how to find constants of theodolite (K, C).	9	2
7	Training on how to stake out horizontal curves using different methods (tape only, tape and theodolite and two theodolites).	10,11,12,13	8
8	Training on how to stake out vertical curves.	14	2
Number of Weeks /and Units Per Semester		**14**	**28**

VI. Teaching strategies of the course:

- Lecture
- Dialogue and discussion
- Brainstorming
- Problem Solving
- Practical application
- Projects
- Reports
- Drawing

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VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Problems on correction and calculation the theodolite observations.	a1, a2, b1, b2. d1	2	0.5
2	Problems for solving closed and open theodolite polygons.	a1, a2, b1, b2. d1	3	0.5
3	Problems on finding incomplete observations according to the given measurements.	a1, a2, b1, b2. d1	5	0.5
4	Problems on trigonometric levelling.	a1, a2, b1, b2. d1	7	0.5
5	Problems on tacheometric measurements.	a1, a2, b1, b2. d1	8	0.5
6	Problems on how to find the theodolite constant (K, C).	a1, a2, b1, b2. d1	10	0.25
7	Problems on horizontal and vertical curves.	a1, a2, b1, b2. d1	12	0.25

VIII. Reports:

No	Assignments	Aligned CILOs(symbols	Week Due	Mark
1	Report of knowing and understanding the theodolite instrument and how to prepare it for monitoring	a1, c1	1	1
2	Report of using theodolite to measure horizontal and vertical angles.	b1, c1, c2, d1	2	2
3	Report of surveying using the tape and theodolite for closed and open polygons	b1, c1, c2. d1	3	2
4	Report of Trigonometric levelling.	b1, c1, c2. d1	5	2
5	Report of tacheometric measurement using (stadia hairs method, shadow method and invar arm method).	b1, c1, c2. d1	6	2
6	Report of finding constants of theodolite (K, C).	b1, b2, c1, c2. d1	7	2

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7	Report of stake out horizontal curves using different methods (tape only, tape and theodolite and two theodolites).	b1, b2, c1, c2. d1	8	2
8	Report of stake out vertical curves.	b1, b2, c1, c2. d1	9	2

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

Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Tasks and Assignments	weekly	3	2%
2	Quiz 1 & 2	4 & 10	4,5	3%
3	Midterm Exam	7	22.5	15%
4	Report	weekly	15	10%
5	Final Exam (practical + Rep.)	13	15	10%
6	Final Exam (theoretical)	14	90	60%

X. Learning Resources:

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

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

1- Surveying coverage of Roads, Amman 1999
2- practically work in the filed

2- Essential References.

1- Fundamentals of surveying –
2- Surveying

3- Electronic Materials and Web Sites *etc*.

XI. Course Policies:	
Unless otherwise stated, the normal course administration policies and rules of the Faculty of ----- apply. For the policy, see: ----------	
1	**Class Attendance:** - The regulations are applied, which state that a student who desires more than 25% of attending lectures is deprived of the final examination.
2	**Tardy:** - If the student is late for attending the lecture time, his degree will be deducted for each delay in the attendance grades.
3	**Exam Attendance/Punctuality**: - The student must rely on himself for exam.
4	**Assignments & Projects:** -
5	**Cheating:** - If the student is caught cheating, he will be deprived of the exam in the subject.
6	**Plagiarism:** - In the case of student impersonation, the Vice Dean for student Affairs will be referred to the College's Student Affairs Committee the necessary action.
7	**Other policies**: - If the student dose not attend more than 75% in the process, he will be deprived of the practical exam.

I. Course Identification and General Information:

1	**Course Title:**	***Mathematics (4)***				
2	**Course Code & Number:**	Br104				
3	**Credit hours:**	C.H				**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**	
		2	2			3
4	**Study level/ semester at which this course is offered:**	2nd Year/ Level 2nd semester				
5	**Pre –requisite (if any):**	Mathematics 3				
6	**Co –requisite (if any):**					

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8	**Program (s) in which the course is offered:**	Bachelor of Science in Civil Engineering (B.S.C.E.)
9	**Language of teaching the course:**	English and Arabic
10	**Location of teaching the course:**	Classes
11	**Prepared By:**	Dr. Adnan Al-Salihi
12	**Date of Approval**	

II. Course Description:

This course introduces to students the Integral transformations. Topics to be covered include:
Laplace transforms: definitions, properties and theorems, Inverse transform and Solution of ordinary and partial differential by Laplace transform, Laplace transform of special functions, Applications.
Fourier series, integrals and transforms: Definitions and properties, usual and arbitrary period, Fourier series of odd and even functions, Definitions and properties of Fourier transform with applications and Fourier transform of special functions.
Z transforms: Definitions and properties of Z transforms, including convergence, inversion techniques, application.

III. Course Intended learning outcomes (CILOs) of the course		**Referenced PILOs**
a.1	Recognize the definitions, basic properties and theorems of the Laplace Transforms, Fourier series, Fourier transforms and Z Transform and how to compute it for common functions.	**A1**
a.2	Identify inverse of Laplace, Fourier and Z transforms by a different method.	**A3**
b.1	Demonstrate proficiency in choose appropriate methods for perform a Laplace transform, Fourier series, Fourier transforms and Z transforms.	**B1, B2**
b.2	Compare between Laplace transforms, Fourier transforms, Z transforms and discrete Fourier transforms and its applications.	**B2**
c.1	Applying Laplace and Fourier transforms and Fourier series to solve the differential equations.	**C3**

c.2	Solve simple linear difference equations using the Z-transform approach.	**C3**
c.3	Build a mathematics models and solve problems in engineering applications using transformation theory.	**C3**
d.1	Effectively manage tasks, time, and resources.	**D2**
d.2	Communicate and work effectively in group and individually.	**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- Recognize the definitions, basic properties and theorems of the Laplace Transforms, Fourier series, Fourier transforms and Z Transform and how to compute it for common functions	- Lectures. - Tutorials	- Written tests - Written assessment. - Report, homework and assignments.
a2- Identify inverse of Laplace, Fourier and Z transforms by a different method.	- Lectures. - Tutorials	- Written tests - Written assessment. - Report, homework and assignments.

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

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Demonstrate proficiency in choose appropriate methods for perform a Laplace transform, Fourier series, Fourier transforms and Z transforms.	- Lectures. - Tutorials	- Written tests - Written assessment. - Report, homework and assignments.
b2- Compare between Laplace transforms, Fourier transforms, Z transforms and discrete Fourier transforms and its applications.	Lectures, Tutorials	- Written tests - Written assessment. - Report, homework and assignments.

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- Applying Laplace and Fourier transforms and Fourier series to solve the differential equations.	Lectures, Tutorials	- Written tests - Written assessment. - Report, homework and assignments.
c2- Solve simple linear difference equations using the Z-transform approach.	- Lectures. - Tutorials	- Written tests - Written assessment. - Report, homework and assignments.
c3- Build a mathematics models and solve problems in engineering applications using transformation theory.	- Lectures. - Tutorials	- Written tests - Written assessment. - Report, homework and assignments.

(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Effectively manage tasks, time, and resources.	- Lectures. - Tutorials	- Written tests - Written assessment. - Report, homework and assignments.
d2- Communicate and work effectively in group and individually.	- Lectures. - Tutorials	- Written tests - Written assessment. - Report, homework and assignments.

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Introduction of Laplace transform	a1, b1, d1	• Definition of Laplace transforms. • Laplace transforms of elementary functions.	1	2
2	Properties of Laplace transform	a1, b1, d1	• Properties and theorem of Laplace transform. • Laplace transform of special functions: unit step function, Dirac-delta function and periodic functions. • Generalization of Laplace Transforms by means of Gamma functions.	1	2
3	Inverse Laplace transform	a1, a2, b1, d1, d2	• Basic concepts and definitions. • Properties and theorems of Inverse Laplace transform.	2	4
4	Methods to find Inverse Laplace transform	a1, a2, b1, c1, d1, d2	• Inverse Laplace transform by partial fraction and convolution theorem	1	2

5	Application of Laplace transforms	a1, a2, b1, c3, c1, d1	• Application of Laplace transform to ordinary and partial differential equations.	1	2
6	Fourier series	a1, b1, d1, d2	• Definition and Convergence. • Periodic and non-periodic Functions. • Fourier Cosine and Sine Series • Half intervals Fortier Series Convergence Theorem.	1	2
7	Fourier series	a1, b1, d1, d2	• Definition and Convergence. • Periodic and non-periodic Functions. • Fourier Cosine and Sine Series • Half intervals Fortier Series Convergence Theorem.	1	2
8	Fourier integral	a1, b1, c1, d1, d2	• Fourier integrals. • Fourier sine and cosine integrals	1	2
9	Fourier transforms and Inverse Fourier transforms and its applications.	a1, a2, b1, c1, c3, b2, d1	• Fourier transforms • properties and theorems of Fourier transforms. • Inverse Fourier transforms. • Fourier sine and cosine transforms. • The relation between Laplace and Fourier. • Application of Fourier series to partial differential equation	3	6
10	Z Transforms	a1, b1, c2, d1	• Concept of Z-Transform of a Discrete Sequence. • Distinction between Laplace, Fourier and Z Transforms.	1	2
11	Inverse Z Transforms and applications	a1, a2, b1, b2, c1, c2, c3, d2	• Region of Convergence. • Inverse Z-transform • Properties of Z-transforms. • Applications for Z-transforms.	1	2
Number of Weeks /and Units Per Semester				**14**	**28**

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B – Tutorial Aspect:				
Order	**Tasks/ Experiments**	**Number of Weeks**	**contact hours**	**Learning Outcomes**
1	Introduction of Laplace transform and Laplace transform of elementary functions : Tutorial 11	1	**2**	a1,b1 ,d1
2	Properties and theorems of Laplace transform	1	**2**	a1,b1 ,d1
3	Inverse Laplace transform	1	**2**	a1,a2,b1,d1,d2
4	Methods to find inverse Laplace transform (partial fraction and convolution theorem)	2	**4**	a1,a2,b1, ,c1,d1, d2
5	Application of Laplace transforms to solve ordinary and partial differential equations.	1	**2**	a1,a2,c1, c3, c1,d1
6	Fourier series and Fourier Cosine and Sine Series	2	**4**	a1,b1,d1,d2
7	Fourier integrals	1	**2**	a1 ,b1,c1, d1, d2
8	Fourier transforms and Inverse Fourier transforms and its applications.	3	**6**	a1,a2,b1, c1,c3,b2,d1
9	Z Transforms	1	**2**	a1 ,b1, c2,d1
10	Inverse Z Transforms and applications	1	**2**	a1,a2,b1, b2,c1,c2, c3, d2
Number of Weeks /and Units Per Semester		**14**	**28**	

V. Teaching strategies of the course:

- Lectures
- Tutorials

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VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Coursework assignments	a1, a2, b1, b2, c1, c2, c3, d1	During of semester	3.5
2	Quiz 1	a1, a2, b1, c, c3, d1	4	1
3	Quiz 2	a1, a2, b1, b2, c1, c2, c3, d1	10	1
4	Report	b2, c3	5	2

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	Written assignment	During of semester	7.5	5%	a1, a2, b1, b2, c1, c2, c3, d1
2	Quizzes	4^{th} & 10^{th}	7.5	5%	a1, a2, b1, b2, c1, c2, c3, d1
3	Midterm exam	8^{th} week	30	20%	a1, a2, b1, c1, c3, d1
4	Final exam	End of semester	105	70%	a1, a2, b1, b2, c1, c2, c3
	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- Advanced Engineering Mathematics, sixth edition, by Dennis G. Zill, Jones & Bartlett Learning, 2018.
2- Mathematical Methods, S.Sivaiah , Laxmi publications(p) LTDA.
3- A Text Book of Engineering Mathematics, Vol (II), by Dr.Rajesh Pandey, word press, First edition, 2010.

2- Essential References.

1- Schaum's Outline of Theory and problems of Laplace Transforms, Murray R. Spiegel, Ph.D , Tata Mc-GRAW-HILL publishing Company, 2005.
2- Schaum's Outline of Theory and problems of Fourier Analysis, Murray R. Spiegel, Ph.D , Tata Mc-GRAW-HILL publishing Company, 2004.

3- Electronic Materials and Web Sites *etc*.

1- wolframMathworld
http://mathworld.wolfram.com/topics/CalculusandAnalysis.html

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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. Mohammad Algorafi**
	Deputy Rector for Academic Affairs Dr. Ibrahim AlMutaa **Dr. Ahmed mujahed** **Dr. Munaser Alsubri**

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Template for Course Plan (Syllabus) of Mathematics (5)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Adnan Al-salihi	**Office Hours**					
Location& Telephone No.	00967770499879	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	Adnans2000@gmail.com						

II. Course Identification and General Information:						
1-	**Course Title:**	***Mathematics (5)***				
2-	**Course Number & Code:**	CE203				
3-	**Credit hours:**	**C.H**				**Credit Hours**
		Th.	**Tu.**	**Pr.**	**Tr.**	
		2	2			3
4-	**Study level/year at which this course is offered:**	2nd Year/ Level 2nd semester				
5-	**Pre –requisite (if any):**	Mathematics 3				
6-	**Co –requisite (if any):**					
7-	**Program (s) in which the course is offered**	Bachelor of Science in Civil Engineering (B.S.C.E.)				
8-	**Language of teaching the course:**	English and Arabic				
9-	**System of Study:**	Credit Hours System				
10-	**Mode of delivery:**	Full Time				
11-	**Location of teaching the course:**	Classes				

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III. Course Description:

This course introduces to students the Integral transformations. Topics to be covered include:

Laplace transforms: definitions, properties and theorems, Inverse transform and Solution of ordinary and partial differential by Laplace transform, Laplace transform of special functions, Applications.

Fourier series, integrals and transforms: Definitions and properties, usual and arbitrary period, Fourier series of odd and even functions, Definitions and properties of Fourier transform with applications and Fourier transform of special functions.

Z transforms: Definitions and properties of Z transforms, including convergence, inversion techniques, application.

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

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

a.1. Recognize the definitions, basic properties and theorems of the Laplace Transforms, Fourier series, Fourier transforms and Z Transform and how to compute it for common functions.

a.2. Identify inverse of Laplace, Fourier and Z transforms by a different method.

b.1. Demonstrate proficiency in choose appropriate methods for perform a Laplace transform, Fourier series, Fourier transforms and Z transforms.

b.2. Compare between Laplace transforms, Fourier transforms, Z transforms and discrete Fourier transforms and its applications.

c.1. Applying Laplace and Fourier transforms and Fourier series to solve the differential equations.

c.2. Solve simple linear difference equations using the Z-transform approach.

c.3. Build a mathematics models and solve problems in engineering applications using transformation theory.

d.1. Effectively manage tasks, time, and resources.

d.2. Communicate and work effectively in group and individually.

V. Course Content:

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

A – Theoretical Aspect:

Order	Topics List		Week Due	Contact Hours
1	Introduction of Laplace transform and Laplace transform of elementary functions	• Definition of Laplace transforms. • Laplace transforms of elementary functions.	1	2
2	Properties and theorems of Laplace transform	• Properties and theorem of Laplace transform. • Laplace transform of special functions: unit step function, Dirac-delta function and periodic functions. • Generalization of Laplace Transforms by means of Gamma functions.	2	2
3	Inverse Laplace transform	• Basic concepts and definitions. • Properties and theorems of Inverse Laplace transform.	3	2
4	Methods to find inverse Laplace transform (partial fraction and convolution theorem methods)	• Inverse Laplace transform by partial fraction and convolution theorem	4,5	4
5	Application of Laplace transforms to solve ordinary and partial differential equations.	• Application of Laplace transform to ordinary and partial differential equations.	6	2
6	Fourier series and Fourier Cosine and Sine Series	• Definition and Convergence. • Periodic and non-periodic Functions. • Fourier Cosine and Sine Series	7	4

		• Half intervals Fortier Series Convergence Theorem.		
7	Midterm Exam		8	2
8	Fourier series and Fourier Cosine and Sine Series	• Definition and Convergence. • Periodic and non-periodic Functions. • Fourier Cosine and Sine Series • Half intervals Fortier Series Convergence Theorem.	9	2
9	Fourier integrals	• Fourier integrals. • Fourier sine and cosine integrals	10,11, 12	2
10	Fourier transforms and Inverse Fourier transforms and its applications.	• Fourier transforms • properties and theorems of Fourier transforms. • Inverse Fourier transforms. • Fourier sine and cosine transforms. • The relation between Laplace and Fourier. • Application of Fourier series to partial differential equation	13	6
11	Z Transforms	• Concept of Z-Transform of a Discrete Sequence. • Distinction between Laplace, Fourier and Z Transforms.	14	2
12	Inverse Z Transforms and applications	• Region of Convergence. • Inverse Z-transform • Properties of Z-transforms. • Applications for Z-transforms.	15	2
13	Final Exam		16	2
Number of Weeks /and Units Per Semester			**16**	**32**

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B – Tutorial Aspect:			
Order	**Topics List**	**Week Due**	**Contact Hours**
1	Introduction of Laplace transform and Laplace transform of elementary functions : tutorial 1	1	2
2	Properties and theorems of Laplace transform: tutorial 2	2	2
3	Inverse Laplace transform: tutorial 3	3	2
4	Methods to find Inverse Laplace transform (partial fraction and convolution theorem methods): tutorials 4& 5	4,5	4
5	Application of Laplace transforms to solve ordinary and partial differential equations: tutorial 6	6	2
6	Fourier series and Fourier Cosine and Sine Series: tutorial 7 & 8	7,8	4
7	Fourier integrals: tutorial 9	9	2
8	Fourier transforms and Inverse Fourier transforms and its applications: tutorials 10, 11 & 12	10,11,12	6
9	Z Transforms: tutorial 13	13	2
10	Inverse Z Transforms and applications: tutorial 14	14	2
Number of Weeks /and Units Per Semester		**14**	**28**

VI. Teaching strategies of the course:

- Lectures
- Tutorials

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VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Coursework assignments	a1,a2,b1, b2,c1,c2,c3,d1	During of semester	3.5
2	Quiz 1	a1,a2,b1,c1 ,c3,d1	4th	1
3	Quiz 2	a1,a2,b1, b2,c1,c2,c3,d1	10th	1
	Report	b2,c3	5th	2

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

Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment
1	Written assignment	During of semester	7.5	5%
2	Quizzes	4th & 10th	7.5	5%
3	Midterm exam	8th week	30	20%
4	Final exam	End of semester	105	70%
	sum		**150**	**100%**

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3- Electronic Materials and Web Sites *etc*.

1- wolframMathworld
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X. Course Policies:	
Unless otherwise stated, the normal course administration policies and rules of the Faculty of ----- 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.
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.
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