







T-104 2022

Course Specification

Course Tille:	Engineering	Mechanics
Course Code:	101EE-3	

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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Α.	General	information	about the	course:

Course	Identification
	achinoation

1. Credit hours: 3 (3,0,1)

2. Course type

- a. University □ College □ Department⊠ Track□ Others□
- b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 4th/2nd

4. Course general Description

Statistics:

Forces and moments for planar systems; Basic equilibrium conditions; Centroids; Friction; Area and mass moments of inertia; Kinematics of a particle: rectilinear and curvilinear motion;

Dynamics:

Kinetics and Kinematics of particles and rigid body: Newton's law, work and energy; Relative velocity and acceleration; translation, fixed axis rotation, general motion, work and energy.

5. Pre-requirements for this course (if any): 107Math-3 Algebra & Analytical Geometry

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Solve problems related to forces and moments for planar systems.
- 2. Analyze basic equilibrium conditions.
- 3. Analyze the kinematics of a particle
- 4. Analyze the dynamics of particles and rigid body.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

NO Activity Contact Hours







B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		<u> </u>
1.1	Identify, formulate, and solve engineering problems using mathematical theorem.	1	LecturesTutorialsAssignments	 Homework Assignment Quizzes Final exam
1.2	Apply knowledge of engineering mathematics to analyze the electrical systems.	7	LecturesTutorialsAssignments	 Homework Assignment Quizzes Test 1 Final exam
1.3				
1.4				
2.0	Skills			
2.1	Analyze three- dimension force and moment problems and how to use vector terminology for moment of inertia, force, work, and energy.	6	- Lectures - Tutorials - Assignments	 Homework Assignment Quizzes Test 2 Final exam
2.2				
2.3				
2.4				
3.0	Values, autonomy, ar	nd responsibility		
3.1 3.2 3.3				





C. Course Content			
No	List of Topics	Contact Hours	
1	Introduction to engineering mechanics	4	
2	Forces and moments for planar systems	4	
3	Basic equilibrium conditions; Centroids; Friction; Area and mass moments of inertia	4	
4	Kinematics of a particle: rectilinear and curvilinear motion.	12	
5	Kinetics and Kinematics of particles and rigid body.	12	
6	Newton's law, work and energy.	8	
7	Relative velocity and acceleration; translation, fixed axis rotation, general motion.	8	
8	Work and energy.	8	
	Total	60	

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week-6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
F			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Engineering mechanics statics r. c. Hibbeler. Prentic hall, 2015.
Supportive References	Engineering Mechanics: Dyamics, Meriam, JL, and Kraige, LG, 7th Ed., Wiley, 2012.
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum 20 students





Items	Resources
Technology equipment (projector, smart board, software)	Laptops Data show MATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	- A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Engineering Mathematics
Course Code: 202EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2

Last Revision Date: 22/08/2023G





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Α.	General info	rmation abou	ut the course:		
Co	urse Identificati	on			
1.	Credit hours:	3 (3,0,1)			
2.	Course type				
a.	University	College 🗆	Department⊠	Track□	Others□
b.	Required 🗵	Elective□			
3. off	Level/year at w ered: 5 th /3 rd	hich this course	e is		
4. Course general Description Vector analysis including vector fields, gradient, divergence, curl, line and surface integrals, Gauss' and Stokes' theorems. Introduction to complex variables, eigenvalues and eigenvectors. Commonly used engineering functions, series and sequences.					
5.	Pre-requiremen	ts for this cour	se (if any): Advanc	ed Calculus (203MATH-3)
6.	Co- requiremen	ts for this cour	se (if any): NA		

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Understand the definitions of Vector Space and its linear Independence
- 2. Solve Eigen value problems and apply Cayley Hamilton Theorem.
- 3. Study Curl and divergence with their applications.
- 4. Derive mathematical models of physical systems.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	





60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Identify, formulate, and solve engineering problems using mathematical theorem.	1	 Lectures Tutorials Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Final exam
1.2	Apply knowledge of engineering mathematics to analyze the electrical systems.	7	 Lectures Tutorials Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Test 1 Final exam
1.3				
1.4				
2.0	Skills			
2.1	Solving electrical engineering applications by using mathematical theorem.	6	 Lectures Tutorials Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Test 2 Final exam
2.2				
2.3				
2.4				
3.0	Values, autonomy, ar	nd responsibility		
3.1				
3.2				
3.3				
3.4				

C. Course Content

No	List of Topics	Contact Hours
1	Complex numbersPhasor rotation by $\pi/2$ Complex numbers and operationsSolution of quadratic equationsPolar form of a complex number	15





	Applications of complex numbers to AC linear circuits The importance of being exponential	
2	Vectors Vectors and vector quantities Addition and subtraction of vectors Magnitude and direction of a 2D vector – polar coordinates Application of vectors to represent waves phasors) Multiplication of a vector by a scalar and unit vectors Basis vectors Products of vectors Vector equation of a line	15
3	Vector calculus The gradient of a scalar field Differentiating vector fields The scalar line integral Surface integrals	15
4	Systems of linear equations, matrices, and determinants Matrices Systems of Equations Gauss elimination The inverse and determinant of a 3×3 matrix	15
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Advanced Engineering Mathematics by P. O'Neil, International Student Edition. 2011
Supportive References	Mathematics for Electrical Engineering and Computing by Mary Attenborough, 2003
Electronic Materials	None
Other Learning Materials	Computer programing tools (MATLAB)





2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum 20 students
Technology equipment (projector, smart board, software)	Laptops Data show MATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Computer Programming for Engineers
Course Code: 204GE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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F. Assessment of Course Qualit	6	
G. Specification Approval Data		





A. General information about the course:						
Сс	ourse Identificati	on				
1.	Credit hours:	3 (2,1,0)				
2.	Course type					
a.	University 🗆	College 🗆	Dep	artment⊠	Track□	Others□
b.	Required 🗵	Elective□				
3. off 4.	Level/year at wl fered: 7 th /3 rd Course general	hich this course	e is	D		norie en Cimale
Computer Algorithms; Developing Algorithms; Programming Preliminaries; Simple computer Programs; Numeric Constants and Variables; Arithmetic Expressions; Input and Output in C Programs; Conditional statements; Implementing loops in Programs; Defining and Manipulation Arrays; Logical Expressions and More Control statements; C Programs Examples; Functions; Enumerated data Type and stacks; Structures; Pointer Data Type and its Applications; Lists and Trees; Recursion; Bit level Operations and Applications; Files in C; Miscellaneous Features of C.						
5. Pre-requirements for this course (if any): NA						
6. Co- requirements for this course (if any): NA						
7	Course Main Ob	is stive (s)				

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Understand the basic computer programming concepts.
- 2. Programming some examples with C language

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100
2.	E-learning		
3.	Hybrid Traditional classroom E-learning 		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	





5.	Others (specify)	
	Total	40

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Identify the Basic Structure and syntaxes of Programming languages.	1	Lectures and lab work	Theoretical exams, practical Exams, Quizzes
1.2	Distinguish different data types.	1	Lectures and lab work	Theoretical exams, practical Exams, Quizzes
1.3				
1.4				
2.0	Skills			
2.1	Develop Computer Algorithms.	6	Lectures and lab work	Theoretical exams, practical Exams, Quizzes
2.2	Apply C programming language in solving mathematical, physical and engineering problems.	6	Lectures and lab work	Theoretical exams, practical Exams, Quizzes
2.3				
2.4				
3.0	Values, autonomy, and responsi	bility		
3.1				
3.2				
3.3				
3.4				





No	List of Topics	Contact Hours
1	Introduction to programming languages	4
2	Input and output in C language.	12
3	Studying the syntaxes of C language.	8
4	Sequential, selection and repetitive structures of C language.	14
5	Arithmetic and mathematical expressions.	8
6	Functions, arrays and pointer.	14
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm Exam	10	20
2.	Quiz 1	7	5
3.	Quiz 2	12	5
4.	Lab work	Weekly	20
5.	Final exam	At the end of the semester as determined by the academic calendar	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	"Computer Programming in C," by V. RAJARAMAN Eastern Economy Edition.
Supportive References	"Problem Solving and Program Design in C," Jeri R. Hanly & Elliot B. Koffman, Seventh Ed., Pearson, 2013 Other supplemental materials "C "How to Program," P. J. Deitel & H. M. Deitel, Sixth Ed., Pearson, 2010
Electronic Materials	http://lib.nu.edu.sa/
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom and lab





Items	Resources
Technology equipment (projector, smart board, software)	Data show, Smart Board, Internet access, Software
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Electrical Circuits Lab
Course Code: 213EE-1
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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A. General information about the course:

Course Identification

1. Credit hours: 1 (0,2,0)

2. Course type

- a. University □ College □ Department⊠ Track□ Others□
- b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 6th/3rd

4. Course general Description

In this course students will perform experiments to verify practically the theories and concepts learned in 216EE-3 and 217EE-3. This lab course introduces circuit using Ohm's law, KVL, KCL, Superposition, Thevenin's and Maximum power transfer theorems in DC circuits. Topics include also AC circuits, resonant circuits, transient response of 1st order circuits, magnetically coupled circuits and three phase circuits.

5. Pre-requirements for this course (if any): NA

6. Co- requirements for this course (if any): 217EE-3 Electrical Circuits II

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Recognize electrical laboratory devices.
- 2. Recognize and analyze of Electric Circuits using Fundamental laws: Ohm's law, Kirchhoff voltage law (KVL) and Kirchhoff current law (KCL).
- 3. Analyze of basic series, parallel and series-parallel Circuits.
- 4. Describe and analyze Electric Circuits using superposition, Thevenin, and maximum power transfer theorems.
- 5. Categorize the response of various types of resonant circuits.
- 6. Analyze Response of Transient Response of 1st Order Circuits.
- 7. Making use of the equipment's and techniques in the laboratory to translate the theory into reality.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		





No	Activity	Contact Hours
1.	Lectures	
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understand	ing		
1.1	Recognize electrical laboratory devices	1	 Pre-lab lectures Experiment 	 Reports Pre-labs Lab Performance Mid Term Exam Final Exam
1.2				
1.3				
1.4				
2.0	Skills			
2.1	Verify Ohm's and Kirchhoff's laws.	6	 Pre-lab lectures Experiment 	 Reports Pre-labs Lab Performance Mid Term Exam Final Exam
2.2	Apply Superposition, Thevenin and Maximum power transfer theorems.	6	Pre-lab lecturesExperiment	 Reports Pre-labs Lab Performance Mid Term Exam Final Exam
2.3	Estimate experimentally the resonance frequency of series and parallel AC circuits.	6	 Pre-lab lectures Experiment	 Reports Pre-labs Lab Performance Mid Term Exam Final Exam





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.4	Examine the transient response.	6	Pre-lab lecturesExperiment	 Reports Pre-labs Lab Performance Mid Term Exam Final Exam
2.5	Communicate effectively in group discussion and oral examination.	3	- Experiment	 Lab Performance and oral examination Reports
3.0	Values, autonomy, and resp	oonsibility		
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Experiment	- Reports
3.2	Work effectively as a member of the team.	5	- Experiment	Lab Performance and oral examination

C. Course Content

No	List of Topics	Contact Hours
1	Resistor Color Code	2
2	Ohm s Law, Series and parallel DC circuit (KVL & KCL)	2
3	Series-Parallel DC Circuits	2
4	Superposition Theorem	2
5	Maximum Power Transfer Theorem	2
6	(RC) Low pass and High pass filters	2
7	Resonant (RLC) band pass and band stop filters	2
8	Two-port Network	2
9	Transients in DC Circuits	2
10	Op-Amp (inverting & non inverting)	2
	Total	30





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Reports	Every experiment	10%
2.	Pre-lab Quiz	Every experiment	10%
3.	Lab Performance	Every experiment	10%
4.	Mid Term Exam	8	20%
5.	Final Exam	End of the semester	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Boylestad , "Introductory Circuit Analysis" , Twelfth EDITION, Pearson Prentice Hall.
Supportive References	James W. Nilsson and Susan A. Riedel, "Electric Circuits", EIGHTH EDITION, Pearson Prentice Hall. Fundamentals of Electric Circuits by C. D. Alexander and M. N. O. Sadiku, third Edition, Mc Graw-Hill Education, 2007.
Electronic Materials	http://lib.nu.edu.sa/digitallibbrary.aspx
Other Learning Materials	Lab manual

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	-
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues			Assessor	Assessment Methods	
Effectiveness of teaching		Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.		
Effectiveness assessment	of	students	Students	Students evaluate the course instructor	





Assessment Areas/Issues	Assessor	Assessment Methods
		through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Code: 216EE-3

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. General information about the course:						
Course Identification						
1.	Credit hours:	3 (3,0,1)				
2.	Course type					
a.	University 🗆	College 🗆	Department⊠	Track□	Others□	
b.	Required ⊠	Elective				
3. of	Level/year at wl fered: 5 th /3 rd	hich this course	e is			
 Circuit theorems: superposition principle, Thevenin and Norton theorems; maximum power transfer theorem Techniques of circuit analysis: Nodal and mesh analysis; Sinusoidal sources and the concept of phasor in circuit analysis; Introduction to concept of active, reactive, complex power and power factor. 5. Pre-requirements for this course (if any): 106MATH-3 and 105PHIS-4 6. Co- requirements for this course (if any): NA 						
7. Course Main Objective(s) After completing this course the students should be able to:						
 Explain basic circuit elements and concepts. Explain basic laws of circuit theory. Analyze series/parallel DC circuits using Ohm's and Kirchhoff's laws. Analyze DC circuits using mesh and Nodal methods. Analyze circuits using Thevenin's, Norton's, superposition, and maximum power transfer theorems. Analyze AC circuits. 						

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		





No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Identify and analyze Series/Parallel DC Circuits using Ohm's and Kirchhoff's Laws.	1	- Lectures - Tutorials	- Quizzes - Test 1 Final exam
2.0	Skills			
2.1	Analyze DC Circuits using Mesh and Nodal Methods of Analysis	6	- Lectures - Tutorials	- Quizzes - Test 1 Final exam
2.2	Analyze DC Circuits using Superposition, Thevenin's, Norton's and Maximum power transfer Theorems.	6	- Lectures - Tutorials	- Quizzes - Test 2 Final exam
2.3	Analyze AC Circuits	6	- Lectures - Tutorials	QuizzesTest 2Final exam
2.4				
3.0	Values, autonomy, ar	nd responsibility		
3.1				

C. Course Content

No	List of Topics	Contact Hours





1	Current, voltage and resistance.	4
2	Ohm's law, power and energy calculations.	4
3	Kirchhoff's current and voltage laws in series/parallel DC circuit analysis.	8
4	Mesh, nodal analysis and source transformation.	12
5	Superposition, Thevenin, Norton and maximum power transfer theorems.	12
6	Sinusoidal Alternating Waveforms and phasor representation.	8
7	Series, Parallel and Series/Parallel AC circuits	12
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Quizzes	At the completion of every CLO	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
_			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Boylestad, "Introductory Circuit Analysis", Twelfth Edition, Pearson Prentice Hall. 2010.
Supportive References	 James W. Nilsson and Susan A. Riedel, "Electric Circuits", EIGHTH EDITION, Pearson Prentice Hall. Fundamentals of Electric Circuits by C. D. Alexander and M. N. O. Sadiku, third Edition, Mc Graw-Hill Education, 2007.
Electronic Materials	http://lib.nu.edu.sa/digitallibbrary.aspx www. en.wikipedia.org/wiki/Electrical_network www. allaboutcircuits.com
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 15 students





Items	Resources
Technology equipment (projector, smart board, software)	Classroom with adequate daylight equipped with data projector, separated from white board.
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023










T-104 2022

Course Specification

Course Title:	Electrical Circuits II

Course Code: 217EE-3

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. General information about the course:

Course Identification

1. Credit hours: 3 (3,0,1)

2. Course type

- a. University □ College □ Department ⊠ Track □ Others □
- b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 6th/3rd

4. Course general Description

Time domain transient responses for first and second order circuits, Resonance in Series and parallel AC circuits, Frequency domain analysis: bode plots and passive filters, Magnetically coupled circuits, Two port networks, Analysis of three-phase circuits with balanced conditions.

5. Pre-requirements for this course (if any): Electrical Circuits I (216EE-3)

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Analyze Response of First and Second-Order transient circuits.
- 2. Categorize the response of various types of resonant circuits.
- 3. Analyze low-pass, high-pass, band-pass, and stop-band filter circuits.
- 4. Recognize and analyze two-port networks.
- 5. Describe and analyze transformers.
- 6. Analyze balanced three-phase circuits applying single-phase equivalent circuits.
- **7.** Make use of circuit analytical methods and techniques in electronic circuit analysis.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100
2.	E-learning		
3.	Hybrid Traditional classroom E-learning 		
4.	Distance learning		





No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Identify the circuits containing magnetically coupled coils.	1	- Lectures - Tutorials	- Quizzes - Test 2 - Final exam
1.2				
1.3				
1.4				
2.0	Skills			
2.1	Analyze RL, RC and RLC circuits to determine transient response	6	-Lectures - Tutorials	- Quizzes - Test 1 - Final exam
2.2	Design of low-pass, high-pass, band- pass, and stop- band filter circuits.	2	-Lectures - Tutorials	 Mini project Quizzes Test 1 Final exam
2.3	Analyze circuits consisting of two- port networks	6	-Lectures - Tutorials	QuizzesTest 2Final exam
2.4	Analyze balanced three-phase circuits applying single- phase equivalent circuit.	6	-Lectures - Tutorials	- Quizzes - Test 2 - Final exam
3.0	Values, autonomy, ar	nd responsibility		
3.1	Recognize ethical and professional responsibilities in engineering situations	4	-Lectures - Tutorials	 Mini project Report





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	and make informed judgments			
3.2				
3.3				
3.4				

C. Course Content

No	List of Topics	Contact Hours
1	Analysis of Response of First and Second-Order circuits.	8
2	Analysis of Frequency Response of RLC circuit.	8
3	Introduction to Filters.	8
4	Introduction to Two-Port Circuits.	12
5	Introduction to Mutual Inductance and Transformers.	12
6	Introduction to Three-Phase Circuits, and Electronic Devices Circuits.	12
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Quizzes	Random	5 %
4.	Mini Project	Week 14	5 %
5.	Final Exam	At the end of the semester as determined by the academic calendar	50 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	James W. Nilsson and Susan A. Riedel, "Electric Circuits", 11 th Edition, Pearson Prentice Hall. 2018
Supportive References	Boylestad, "Introductory Circuit Analysis", Twelfth Edition,Pearson Prentice Hall. 2010.Fundamentals of Electric Circuits by C. D. Alexander and M.N. O. Sadiku, third Edition, Mc Graw-Hill Education, 2007.
Electronic Materials	http://lib.nu.edu.sa/digitallibbrary.aspx www.en.wikipedia.org/wiki/Electrical_network www.allaboutcircuits.com





2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	Classroom with adequate daylight equipped with data projector, separated from white board.
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002



DATE	30/08/2023



















T-104 2022

Course Specification

Course Title: Electronics I		
Course Code: 231EE-3		
Program: Bachelor of Science in Electrical Engineering		
Department: Electrical Engineering		
College: Engineering		
Institution: Najran University		
Version: 2		
Last Revision Date: 22/08/2023G		





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A. General information about the course:

Course Identification				
1. Credit hours: 3 (3,0,1)				
2. Course type				
a. University College Department Track Others				
b. Required ⊠ Elective□				
3. Level/year at which this course is offered: 6 th /3 rd				
This course introduces students to discrete semiconductor devices. It covers essential topics from basic semiconductor theory through to the application of diodes and transistors. It focuses the P-N junction and the Diode as a circuit element, the Bipolar Junction Transistor (BJT) as a circuit device, the Single stage BJT amplifier circuits, the Junction Field-Effect-Transistor (JFET) and the Metal Oxide Semiconductor Field Effect Transistor (MOSFET) as circuit element. 5. Pre-requirements for this course (if any): 216EE-3 Electrical Circuits I				
6. Co- requirements for this course (if any): NA				
7. Course Main Objective(s) After completing this course the students should be able to:				
 The discrete semiconductor devices. The essential topics from basic semiconductor theory through to the application of diodes and transistors. 				

- 3. The P-N junction and the Diode as a circuit element.
- The Bipolar Junction Transistor (BJT) as a circuit device, the Single stage BJT amplifier circuits.
- 5. The Junction Field-Effect-Transistor (JFET) and the Metal Oxide Semiconductor Field Effect Transistor (MOSFET) as circuit element.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	





60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
1.0	Outcomes		Strategies	Methods
1.0	Knowledge and understanding			
1.1	characteristics of a diode and its network applications.	1	Lectures Tutorials	Final Exams and Quizzes
1.2	Determine the operation principle and characteristics of BJTs.	1	Lectures Tutorials	Mid Term1 & 2, Final Exams and Quizzes
1.3	Identify and formulate the operation principle and characteristics of JFET and MOSFET.	1	Lectures Tutorials	Mid Term1 & 2, Final Exams and Quizzes
2.0	Skills			
2.1	Apply configurations of BJT transistor to design different circuits.	2	Lectures Tutorials	Mid Term1 & 2, Final Exams and Quizzes
2.2	Analyze and perform a small signal AC analysis using different techniques.	6	Lectures Tutorials	Mid Term1 & 2, Final Exams and Quizzes
2.3	Use the techniques, skills, and modern engineering tools such as Multisim simulator to design electronic circuits	2	Lectures Tutorials	- Mini project Report
3.0	Values, autonomy, and	responsibility		
3.1				

C. Course Content

No	List of Topics	Contact Hours
1	Semiconductor Materials, Energy Levels, Intrinsic and Extrinsic, Materials—n- and p-Type.	8
2	Diode Resistance Levels, Diode Equivalent Circuits Diode Specification Sheets, Zener Diodes, Light-Emitting Diodes (LEDs), Varactor and Photodiode.	8
3	Half and Full-Wave Rectification, Clippers, Clampers, Zener Diodes, Gates.	12





4	Construction, Operation, Configuration, Limits of Operation, transistor Specification Sheet.	12
5	Operating Point for Fixed-Bias Circuit, Emitter Bias Circuit, Voltage- Divider Bias and Voltage Feedback.	6
6	Fixed-Bias Configuration, Common Emitter Configuration and Voltage-Divider Configuration.	б
7	Construction, operation, Characteristics of FETs, Bias and Amplifier Circuits Analysis.	8
Total		60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid Term Exam1	6	20
2.	Mid Term Exam 2	12	20
3.	Mini Project	14	5
4.	Quizzes	Weekly	5
5.	Final exam	End of the semester	50
6.			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Electronic Devices and Circuit Theory, Robert L. Boylestad, 11 th Edition, 2013, Pearson Education.
Supportive References	Electronic Devices ,Tomas.L.Floyd, 9 th Edition, 2011, Prentice Hall Electronic Principles, Albert Malvino and David Bates, 7 th Edition, 2006, McGraw-Hill Education.
Electronic Materials	 Notes of the concerned instructor on blackboard http://lib.nu.edu.sa/digitallibbrary.aspx www. en.wikipedia.org www. allaboutcircuits.com
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Data show, Smart Board, Internet access
Other equipment (depending on the nature of the specialty)	





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods	
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.	
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.	
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus. 	
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software	
Other			
Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)			
Assessment Methods (Direct, Indirect)			

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023









T-104 2022

Course Specification

Course Title: Electromagnetism I
Course Code: 240EE-2
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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Course	Identification						
course							
1. Crec	lit hours:	2 (2,0,1)					
2. Cour	se type						
a. Un	iversity 🗆 🛛 C	ollege 🗆 🛛 🛛	Departmen	t T	rack□	Others	
b. Re	quired 🛛 🛛 El	ective□					
3. Leve 6 th /3 rd	el/year at which	this course is	offered:				
4. Cour	se general Des	cription					
Electros	statics: Coulomb	's law, Electric	flux density	, Gauss's	law and a	pplicatio	ns, Electric potential,
Electric	dipole, Current	density and co	onductors,	Polarizatio	on in Diele	ectrics, E	Boundary conditions,
Poissor	's and Laplace's	equations, Res	sistance, Di	electrics a	and Capac	itance, li	mage method.
Magnet	ostatics: Biot-Sa	avart law, Am	pere's circ	uit law an	id applicat	tions, M	agnetic flux density,
5. Pre-	requirements for	or this course	(if anv): En	aineering	Mathema	atics (20	2EE-3)
				5			-,
6. Co-	requirements fo	or this course	(if any): NA	l l			
7. Cour	se Main Object	ive(s)					
After completing this course the students should be able to:							
1.	1. Calculate electric field, force, potential, energy from various charges and charge						
2 Calculate electric flux flux density and total charge from Gaussian surfaces							
3.	Calculate electr	ic current densi	tv. electric	current an	d resistand	ce of con	ductors.
4.	4. Calculate capacitance and polarization of dielectric materials.						
5.	5. Solve Laplace's equation and find capacitance and resistance of coaxial cables.						
6. Use of different laws and equations to analyze electrostatic and magnetostatic fields.							
7. Study Maxwell's equations and analyze magnetostatic fields.							
1. Leach	ing mode (mar	k all that apply)	Quert	ot Llouis		Deve externe
NO		n instruction		Conta			Percentage
1.		STOOM			45		100
2.	E-learning						
2	Hybrid						
з.		onal classroom					

4. Distance learning

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	45





Codo	Course Learning	Code of CLOs aligned	Teaching	Assessment
Coue	Outcomes	with program	Strategies	Methods
1.0	Knowledge and understanding			
1.1	Apply knowledge of the vector calculus and the fundamental laws of physics to understand the electric and magnetic fields.	7	- Lectures - Tutorials	 Homework Assignment Quizzes Test 1 Test 2 Final exam
1.2	Identify conductive, dielectric and magnetic properties of materials.	1	- Lectures - Tutorials	 Homework Assignment Quizzes Test 2 Final exam
1.3				
1.4				
2.0	Skills			
2.1	Analyze electrostatic forces, fields and potentials on different material environment.	6	LecturesTutorials	 Homework Assignment Quizzes Test 1 Final exam
2.2	Analyze magnetostatic fields and derive Maxwell's equations.	6	LecturesTutorials	 Homework Assignment Quizzes Test 2 Final exam
3.0	Values, autonomy, and	responsibility		
3.1				
3.4				

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

C. Course Content

No	List of Topics	Contact Hours
1	Electrostatics: Coulomb's law, Gauss's law	8
2	Electric potential and electric dipole	4
3	Dielectrics and capacitance, current density and conductors	5
4	Polarization in dielectrics, boundary conditions	6
5	Poisson's and Laplace's equations	6
6	Magnetostatics: Biot-Savart, Ampere's circuit law and applications	6
7	Magnetic flux density, Maxwell's equations for static fields	4
8	Magnetic scalar and vector potentials	4
	Total	45





No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score		
1.	Test 1	Week 6	20 %		
2.	Test 2	Week 12	20 %		
3.	Assignments/Quizzes/group project and presentation	Every chapter	10 %		
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %		

D. Students Assessment Activities

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Matthew N. O. Sadiku, "Elements of Electromagnetics", Oxford
	Edition, 7th Edition, Saunders College, 2018.
Supportivo Poforonoos	William H. Hayt, Jr. John A. Buck, "Engineering
Supportive References	Electromagnetics" Nineth Edition, 2019.
Electronic Materials	Electronically lecture notes provided in e-board.
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData show
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students





Assessment Areas/Issu	les	Assessor	Assessment Methods	
			for feedback of syllabus.	
The extent to which CLOs has achieved	ive been	Teaching staff	CLOSO Software	
Other				
Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect) G. Specification Approval Data				
COUNCIL /COMMITTEE	MMITTEE Electrical Engineering Department Council			
REFERENCE NO.	14450214-0486-00002			
DATE	30/08/2	023		











T-104 2022

Course Specification

Course Title:	Digital Logic Design
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Course Code: 251EE-3

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. General information about the course:

1. Credit hours: 3 (3,0,1)

2. Course type

- a. University □ College □ Department ⊠ Track □ Others □
- b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 6th/3rd

4. Course general Description

Number systems & codes. Logic gates. Boolean algebra. Karnaugh maps. Analysis and synthesis of combinational systems, decoders, multiplexers, adders and subtractors. Types of flip-flops. Sequential circuit analysis and design. VHDL and its application in basic gates.

5. Pre-requirements for this course (if any): NA

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

The main purpose of this course is to identify how to analyze and design the digital systems.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Define number systems; decimal, binary, octal and hexadecimal.	1	- Lectures - Tutorials	Mid-term 1 Final Quizzes
2.0	Skills			
2.1	Analyze Boolean algebra and Karnaugh map for logic circuits simplification.	6	- Lectures - Tutorials	Mid-term 1 Final Quizzes
2.2	Analyze combinational logic and sequential logic circuits.	2	- Lectures - Tutorials	Mid-term 2 Final Quizzes
2.3	Design combinational logic and sequential logic circuits.	2	- Lectures - Tutorials	Mid-term 2 Final Quizzes
2.4				
3.0	Values, autonomy, ar	nd responsibility		
3.1				

C. Course Content

No	List of Topics	Contact Hours
1	Number systems	10
2	Boolean algebra and logic gates	10
3	Simplification of Boolean functions	8
4	Combinational logic circuits design and analysis	4
5	Digital combinational logic (decoders, encoders, multiplexers, demultiplexers)	4
6	Digital combinational logic (adders and subtractors)	4
7	Analysis of sequential circuits	6
8	Design of sequential circuits.	8
9	VHDL and its application in basic gates	6
	Total	60





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Exam1	6	20
2.	Exam 2	12	20
3.	Quizzes	Weekly	10
4.	Final exam	End of the semester	50
_			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Morris Mano , "Digital Design", Prentice Hall, Fifth edition, 2015.
Supportive References	John F. Wakerly, Digital Design: Principles and Practices Package, 4th edition, Prentice-Hall, 2007.
Electronic Materials	http://lib.nu.edu.sa/
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Data show, Smart Board, Internet access
Other equipment (depending on the nature of the specialty)	I

F. Assessment of Course Quality

///////////////////////////////////////	//0000001	Assessment Methous
Effectiveness of teaching F	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.





Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Digital Logic Design Lab
Course Code: 252EE-1
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2022G





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A. General information about the course:

Course Identification

1. Credit hours: 1 (0,2,0)

2. Course type

- a. University □ College □ Department⊠ Track□ Others□
- b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 6th/3rd

4. Course general Description

Number systems & codes. Logic gates. Boolean algebra. Karnaugh maps. Analysis and synthesis of combinational systems, decoders, multiplexers, adders and subtractors. Types of flip-flops. Sequential circuit analysis and design. Simulation of basic gates (OR, NOT) using VHDL.

5. Pre-requirements for this course (if any): NA

6. Co- requirements for this course (if any): Digital Logic Design (251EE-3)

7. Course Main Objective(s)

The main purpose of this course is to identify how to analyze and design the digital systems.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	30





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding	<u>_</u>	
1.1	Define logic circuits laboratory and logic gates.	1	 Pre-lab lectures Experiment 	Exams, Quizzes, Pre- labs and reports
1.2				
1.3				
1.4	Okille			
2.0	SKIIIS	2		_
2.1	Analyze basic Boolean function using logic gates	6	 Pre-lab lectures Experiment 	Exams, Quizzes, Pre- labs and reports
2.2	Analyze combinational logic and sequential logic circuits.	6	Pre-lab lecturesExperiment	Exams, Quizzes, Pre- labs and reports
2.3	Design combinational logic and sequential logic circuits.	2	 Pre-lab lectures Experiment 	Exams, Quizzes, Pre- labs and reports
2.4	Communicate effectively in group discussion and oral examination.	3	- Experiment	Lab Performance and oral examination
3.0	Values, autonomy, ar	nd responsibility		
3.1	Work effectively as a member of the team.	5	- Experiment	Lab Performance and oral examination
3.2	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Experiment	- Reports
3.3				
3.4				





No	List of Topics	Contact Hours
1	Introduction To ETS-8000A	2
2	Experiment 1: Switch and LED	2
3	Experiment 2.1: OR Gate; NOT Gate; NOT-OR Gate;	2
4	Experiment 2.2:NOR Gate; 2-Input NAND Gate 4-Input NAND Gate ;AND-NOR Gate; Staircase Light Control;	2
5	Experiment 3.1: verifying X+0 =X and X+1=1; verifying X*0 =0 and X*1=X; X+X=X, X+X'=1; X*X=X, X*X'=0; (X*Y)'=X'+Y'; (X+Y)'=X'*Y';	2
6	Experiment 3.2: 2-Bit Magnitude Comparator; Voting Machine; Display Patterns;	2
7	Experiment 4.1: Half Adder; Full Adder; Half Subtractor; Full Subtractor	2
8	Experiment 4.2: 4-Bit Adder; 4-Bit Subtractor; BCD Adder	2
9	Experiment 5: 8-to-3 Encoder ; 3-to-8 Decoder	2
10	Experiment 6: Logic Unit; Implementing Logic Function with Multiplexer	2
11	Experiment 7.1: NAND Gate RS Flip-Flop; NOR Gate RS Flip- Flop	2
12	Experiment 7.2: JK Flip-Flop; T Flip-Flop; D Flip-Flop	2
13	Experiment 8.1: Converting JK to D Flip-Flop; Converting JK to T Flip-Flop;	2
14	Experiment 9: Simulation of basic gates (OR, NOT) using VHDL	4
	Total	30

C. Course Content

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Reports	Every experiment	10%
2.	Pre-labs	Every experiment	10%
3.	Performance	Every experiment	10%
4.	Mid Term Exam	8	20%
5.	Final Exam	End of the semester	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Morris , "Digital Design", Prentice Hall, Fifth edition, 2015.
Supportive References	John F. Wakerly, Digital Design: Principles and Practices Package, 4th edition, Prentice-Hall, 2007.





Electronic Materials

http://lib.nu.edu.sa/

Other Learning Materials

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lab Room
Technology equipment (projector, smart board, software)	Data show, Smart Board, Internet access and lab materials
Other equipment (depending on the nature of the specialty)	1

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL	Electrical Engineering Department Council
/COMMITTEE	
REFERENCE NO.	14450214-0486-00002


DATE	30/08/2023





















T-104 2022

Course Specification

Course Title: Instrumentation and Measurements		
Course Code: 314EE-2		
Program: Bachelor of Science in Electrical Engineering		
Department: Electrical Engineering		
College: Engineering		
Institution: Najran University		
Version: 2		
Last Revision Date: 22/08/2023G		





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F. Assessment of Course Qualit	6	
G. Specification Approval Data		





A. General information about the course:						
Сс	Course Identification					
1.	Credit hours:	2 (2,0,0)				
2.	Course type					
a.	University 🗆	College 🗆	Dep	artment⊠	Track□	Others□
b.	Required 🗵	Elective□				
3. of	Level/year at wh fered: 7 th /4 th	nich this course	is			
4. Course general Description Measurement fundamentals: units and errors, statistical analysis: DC and AC analog digital meters constructions :DC and AC bridge : Oscilloscope: CRT, trigger sweep circuits: Oscilloscopes, Analog and Digital Multi meters to measure electrical parameters: Transducers and sensors; passive and active : specifications of Spectrum analyzer, Liquid crystal displays (LCDs) and optical fiber sensor .						
5. Pre-requirements for this course (if any): 216EE-3 Electrical Circuit I						
6. Co- requirements for this course (if any): NA						
7. Aft	7. Course Main Objective(s) After completing this course the students should be able to:					

- 1. Define and classify units and errors.
- 2. Explain the principle work of analog and digital meters
- 3. Recognize and explain DC / AC bridge and oscilloscope used in measurement systems.
- 4. Use the Oscilloscopes, bridge, Analog and Digital Multi meters to measure electrical parameters
- 5. Classify and explain the sensors and transducer

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	45	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		
2. Cor	2. Contact Hours (based on the academic semester)		

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	
3.	Field	





	Total	45
5.	Others (specify)	
4.	Tutorial	15
4.	Tutorial	15

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understand	ing		
1.1	Define and classify units and errors	1	- Lectures - Tutorials	 Assignment Quizzes Test 1 Final exam
1.2	Identify the working principle of analog and digital meters	1	 Lectures Tutorials 	 Assignment Quizzes Test 1 Final exam
1.3	Recognize and explain DC / AC bridge and oscilloscope used in measurement systems	1	LecturesTutorials	- Assignment - Quizzes - Test 2 - Final exam
1.4	Classify the sensors and transducers	1	LecturesTutorials	- Assignment - Quizzes - Test 2 - Final exam
2.0	Skills			
2.1	Use the Oscilloscopes, bridges, Analog and Digital Multimeters to measure electrical parameters	6	LecturesTutorials	 Assignment Quizzes Test 2 Final exam
3.0	Values, autonomy, and resp	onsibility		
3.1				

C. Course Content

No	List of Topics	Contact Hours
1	Measurements fundamentals: Basic and general terms in metrology, Units and standards, errors, Methods of measurements, statistical analysis.	09
2	Analogue meters: DC and Ac meters, loading effect and insertion effect.	09





	Total	45
5	Characteristics and analysis of Sensors and Transducers types	12
4	Difference and instrumentation DC/AC bridge ; Oscilloscopes circuits.	09
3	Digital measurements: Data conversion principles, A/D conversion, D/A conversion, digital voltmeter, grounding, shielding and noise.	06

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Electrical Measurements and measuring instruments by A. K. Sawhney, 2010
Supportive References	Measurement and Instrumentation Principles, by Alan.s.Moris , Butterworth-Heinemann (2001)
Electronic Materials	NA
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum 20 students
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form. [Indirect]
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate. [Indirect]
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus. [Indirect]
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software [Direct]
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Instrumentation and Measurements IAB
Course Code: 315EE-1
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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A. General information about the course:					
Co	ourse Identificati	ion			
1.	Credit hours:	1 (0,2,0)			
2.	Course type				
a.	University	College 🗆	Department⊠	Track□	Others□
b.	Required ⊠	Elective□			
3. Level/year at which this course is offered: 7 th / 4 th					
4. Course general Description Measurement fundamentals: units and errors, statistical analysis: DC current and voltage measurement, Use of Oscilloscope, Use of bridge circuit.					
5. Pre-requirements for this course (if any): NA					
6. Co- requirements for this course (if any): 314EE-2 Instrumentation & Measurements					
7	7 Course Main Objective(s)				

After completing this course the students should be able to:

- 1. To learn fundamentals of the instrumentation and measurements.
- 2. To be familiar with basic terms used in electrical measurements

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage	
1.	Traditional classroom	30	100	
2.	E-learning			
3.	HybridTraditional classroomE-learning			
4.	Distance learning			
2. Contact Hours (based on the academic semester)				

No	Activity	Contact Hours
1.	Lectures	
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understandin	g		
1.1	Identify the errors in measurements and do the statistical analysis	1	- Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.0	Skills			
2.1	Conduct experiment to measure DC voltages and current through the circuit.	6	Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.2	Conduct experiments to measure amplitude, frequency and phase angle using oscilloscope.	6	- Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.3	Use different techniques to measure resistance using DC Bridge circuits.	6	- Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.4	Use techniques to measure the temperature of the tank using thermocouple sensor.	6	- Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.5	Communicate effectively in group discussion.	3	- Lab demonstration	 Lab Report Oral Examination
3.0	Values, autonomy, and respo	onsibility		
3.1	Work effectively as a member of the team.	5	Lab demonstration	Lab Report
3.2	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Experiment	- Reports

C. Course Content

No	List of Topics	Contact Hours
1	Investigate sources of error in measurements and to observe the value of statistical analysis.	8
2	Measurement of DC voltages and current through the circuit.	4
3	Study and learn how to use multi-meter properly.	2





4	Using oscilloscope properly and to measure amplitude, frequency and phase angle by using oscilloscope.	6
5	Study of resistance measurement techniques using DC Bridge circuits	4
6	Study and measure the temperature of the tank using thermocouple sensor	6
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 7	20 %
2.	Quizzes	Every lab	10 %
3.	Lab Report	Every lab	20 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Electrical Measurements and measuring instruments by A. K. Sawhney, 2010
Supportive References	Measurement and Instrumentation Principles, by Alan.s.Moris , Butterworth-Heinemann (2001)
Electronic Materials	Lab notes are delivered to the students through online portal "Blackboard"
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lab for maximum 10 students
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form. [Indirect]
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate. [Indirect]
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus. [Indirect]
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software [Direct]
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Electrical Machines I
Course Code: 320EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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F. Assessment of Course Qualit		
G. Specification Approval Data		





Α.	A. General information about the course:					
Co	urse Identificati	on				
1.	Credit hours:	3 (3,0,1)				
2. (Course type					
a.	University 🗆	College 🗆	Dep	artment⊠	Track□	Others□
b.	Required 🛛	Elective□				
3. off	Level/year at where the second	nich this cours	e is			
 4. Course general Description Transformers (construction, operation of single-phase transformers, equivalent circuit, voltage regulation and efficiency, auto – transformers, three-phase transformers), AC machinery fundamentals, three-phase induction machines (construction, operation, equivalent circuit, performance calculations, starting of induction motors), small AC motors (single-phase induction motors). 5. Pre-requirements for this course (if any): 217EE-3 Electrical Circuits II 						
6. Co- requirements for this course (if any): NA						
7. Course Main Objective(s) After completing this course the students should be able to:						

- 1. Analyze Single-phase transformers, auto transformers and three-phase transformers.
- 2. Analyze three-phase induction machines.
- 3. Study the performance of the three-phase induction machines

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		
~ ~	· · · · · · · · · · · · · · · · · · ·		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Define operation principles of electrical machines	1	LecturesTutorials	 Assignment Quizzes Test 1 Final exam
2.0	Skills			
2.1	Analyze fundamental characteristics of various types of machines	6	- Lectures - Tutorials	 Assignment Quizzes Test 2 Final exam
2.2	Evaluate equivalent circuit and characterize different electrical machines	6	LecturesTutorials	 Assignment Quizzes Test 2 Final exam
3.0	Values, autonomy, ar	nd responsibility		
3.1				

C. Course Content

No	List of Topics	Contact Hours
1	Principles of operation; construction, equivalent circuit, elements of a transformer.	6
2	The ideal transformer, practical transformers, open circuit test, short circuit test, efficiency, regulation	8
3	Practical transformer, three-phase connections.	8
4	Measurement in three-phase, auto-transformer, taps, instrument transformer, parallel operation.	6
5	Basic theory and construction of squirrel-cage and wound-rotor motor	8
6	Equivalent circuit, losses, power flow, efficiency.	8
7	Analysis of machine equations; speed/torque curves, starting performance, starting methods	8
8	Single-phase induction motors	8
	Total	60





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
F			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Ecceptial Poteroneec	Stephen J Chapman, Electrical Machinery Fundamentals,
	Publisher: McGraw-Hill Higher Education, 2011, 5th Edition.
Supportive References	 Denis O'Kelly, Performance and Control of Electrical Machines, Publisher: Mc-Graw Hill Book Company, 1991. Karsai, D Kereny, L Kiss, Studies in Electrical and Electronic. Engineering 25, Large Power Transformers, Publisher: Elsevier, 1987 A E Fitzgerald, Charles Kingsley, Stephen D Umans, Electric Machinery, Sixth Edition, Publisher: Mc-Graw-Hill Higher Education, 2002. Charles I Hubert, Electric Machines, Theory, Operation, Application, Adjustment and Control, Publisher: Macmillan Publishing Company, 1991. Dino Zorbas, Electric Machines, Principles, Applications, and Control Schematics, Publisher: West Publishing Company, 1989.
Electronic Materials	NA
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources	
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum 20 students	
Technology equipment (projector, smart board, software)	Data show	
Other equipment (depending on the nature of the specialty)	None	





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form. [Indirect]
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate. [Indirect]
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus. [Indirect]
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software [Direct]
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Ele	ctronics II
Course Code: 332	EE-3
Program: Bachelor	of Science in Electrical Engineering
Department: Elect	rical Engineering
College: Engineer	ing
Institution: Najran	University
Version: 2	
Last Revision Date:	22/08/2023G





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A. General information about the course:						
Сс	ourse Identificati	on				
1.	Credit hours:	3 (3,0,1)				
2.	Course type					
a.	University 🗆	College 🗆	Dep	partment⊠	Track□	Others□
b.	Required 🗵	Elective□				
3. of	Level/year at wl fered: 7 th /4 th	hich this course	is			
4. Course general Description This course is a continuation of 231EE-3 course. It focuses the analysis of amplifier frequency response, the operational amplifiers design and applications, the power Amplifiers and the feedback concept and oscillator circuits.						
 6. Co- requirements for this course (if any): NA 						
7. Course Main Objective(s) After completing this course the students should be able to:						

- 1. The analysis of amplifier frequency response.
- 2. The operational amplifiers design.
- 3. The power Amplifiers and the feedback concept.
- 4. About oscillator circuits

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Compute frequency responses of FET and BJT amplifiers	1	- Lectures - Tutorials	 Assignment Quizzes Test 1 Final exam
2.0	Skills			
2.1	Analyze operational amplifiers and its sub- circuits.	6	- Lectures - Tutorials	 Assignment Quizzes Test 2 Final exam
2.2	Analyze power amplifier circuits.	6	- Lectures - Tutorials	 Assignment Quizzes Test 2 Final exam
2.3	Analyze oscillators using feedback techniques.	6	- Lectures - Tutorials	 Assignment Quizzes Test 2 Final exam
2.4	Design operational amplifiers	2	-Lectures - Tutorials	 Mini project Report
3.0	Values, autonomy, ar	nd responsibility		
3.1				

C. Course Content

No	List of Topics	Contact Hours
1	Frequency Response of Amplifiers: low and high frequency analysis of BJT and FET amplifier, multistage frequency effects.	20
2	Operational amplifiers: differential amplifier circuit, Op-amp basics and applications, common mode operation.	10
3	Power amplifier circuits: Class A, B, C, and D amplifiers.	15
4	Feedback and Oscillator Circuits: Feedback concept, Practical feedback circuits, feedback amplifier, oscillators operation, phase-shift, Wien bridge, Tuned, Unijunction, crystal.	15
	Total	60





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Mini Project and Quizzes	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Electronic Devices and Circuit Theory, Robert L. Boylestad, 11th Edition, 2013, Pearson Education	
Supportive References	Electronic Devices ,Tomas.L.Floyd, 9th Edition, 2011, Prentice Electronic Principles, Albert Malvino and David Bates, 7th Edit 2006, McGraw-Hill Education.	
Electronic Materials	 Notes of the concerned instructor on blackboard http://lib.nu.edu.sa/digitallibbrary.aspx www. en.wikipedia.org www. allaboutcircuits.com 	
Other Learning Materials	NA	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum 20 students
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form. [Indirect]
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate. [Indirect]
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus. [Indirect]
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software [Direct]
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Electronics Lab		
Course Code: 333EE-1		
Program: Bachelor of Science in Electrical Engineering		
Department: Electrical Engineering		
College: Engineering		
Institution: Najran University		
Version: 2		
Last Revision Date: 22/08/2023G		





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Α.	General	information	about	the	course:

Course identification

1. Credit hours: 1 (0,2,0)

2. Course type

- a. University □ College □ Department ⊠ Track □ Others □
- b. Required ⊠ Elective□
- 3. Level/year at which this course is
- offered: 7th/4th

4. Course general Description

This lab performs experimentation in basic electronic circuits and devices: Diodes, transistors (BJT, FET), DC and small signal AC Analysis, Amplifier configurations. It is equipped with basic electronics equipment package such as digital oscilloscopes, DMM, DC power supply units and function generators.

- 5. Pre-requirements for this course (if any): NA
- 6. Co- requirements for this course (if any): 332EE-3 Electronics II

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Recognize of specification sheets of discrete semiconductor devices ,
- 2. Analyze of Electronic Circuits using semiconductor devices and lab techniques
- 3. Describe and analyze Zener Diodes, Light-Emitting Diodes (LEDs), Varactor and Photodiode.
- 4. Analyze of basic Half and Full-Wave Rectification, Clippers, Clampersand Zener Diodes,
- 5. Categorize Construction, Operation, Configuration, Limits of Operation of transistors,
- 6. Recognize Transistor Configurations, especially Configuration with Common Emitter
- 7. Analyze Transistors Biasing configurations: Operating Point for Fixed-Bias Circuit, Emitter Bias Circuit, Voltage-Divider Bias and Voltage Feedback,
- 8. Recognize and analyze of Small Signal AC Amplifier,
- 9. Making use of the equipments and techniques in the laboratory to translate the theory into reality

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100
2.	E-learning		
3.	HybridTraditional classroom		





No	Mode of Instruction	Contact Hours	Percentage
	E-learning		
4.	Distance learning		
2. Cor	tact Hours (based on the ad	cademic semester)	
No	Activi	ty	Contact Hours
1.	Lectures		
2.	Laboratory/Studio		30
3.	Field		
4.	Tutorial		
5.	Others (specify)		
	Total		30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
	Outcomes	with program	Strategies	Methods
1.0	Knowledge and understanding			
1.1	Apply the knowledge of electronics devices in Electrical Engineering applications.	7	- Lab demonstration	 Quizzes Lab Report Test 1 Final exam
1.2				-
2.0	Skills			
2.1	Analyze characteristics of Semiconductor Diodes.	6	Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.2	Design Electronic circuits using BJT, FET Op. Amp.	2	- Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.3	Communicate effectively in group discussion.	3	- Lab demonstration	 Lab Report Oral Examination
2.5			-	-
3.0	Values, autonomy, ar	nd responsibility		
3.1	Work effectively as a member of the team.	5	Lab demonstration	Lab Report
3.2	Recognize ethical and professional responsibilities in engineering situations	4	- Experiment	- Reports





Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
	Outcomes	with program	Strategies	Methods
	and make informed judgments			

C. Course Content

No	List of Topics	Contact Hours
1	laboratory Test equipment's: voltage sources, Signal Generators, Oscilloscopes and discrete semiconductor devices	2
2	Junction-Diode Characteristics	2
3	Zener-Diode Characteristics	2
4	Opto-Electronic Devices: LEDs, Photodiodes and Optocouplers	4
5	Half-Wave and Full-Wave Rectification	4
6	Transistor input and output characteristics	2
7	Transistor as an amplifier	4
8	Transistor as a switch	4
9	Characteristics of a FET	2
10	Basic Operational Amplifiers circuits	4
Total		

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 8	20 %
2.	Quizzes	Every lab	10 %
3.	Lab Report	Every lab	20 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5.			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities 1. References and Learning Resources

Essential References	Electrical Measurements and measuring instruments by A. K. Sawhney, 2010
Supportive References	Measurement and Instrumentation Principles, by Alan.s.Moris , Butterworth-Heinemann (2001)
Electronic Materials	Lab notes are delivered to the students through online portal "Blackboard"





2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lab for maximum 10 students
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form. [Indirect]
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate. [Indirect]
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus. [Indirect]
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software [Direct]
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL	Electrical Engineering Department Council
	14450214-0486-00002
REFERENCE NO.	14450214-0488-00002




DATE	30/08/2023





















T-104 2022

Course Specification

Course Title: Signals and Systems Analysis		
Course Code: 342EE-3		
Program: Bachelor of Science in Electrical Engineering		
Department: Electrical Engineering		
College: Engineering		
Institution: Najran University		
Version: 2		
Last Revision Date: 22/08/2023G		





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G. Specification Approval Data		





A. General information about the course:					
Сс	ourse Identificati	on			
1.	Credit hours:	3 (3,0,1)			
2.	Course type				
a.	University 🗆	College 🗆	Department⊠	Track□	Others□
b.	Required 🗵	Elective□			
3. Level/year at which this course is offered: 7 th /4 th					
4. Course general Description Motivation, Signal Classifications, Signal Operations, Eigen Functions; Theories of Fourier series for continuous and discrete time signals, Linear circuits and system concepts, impulse response, convolution and transfer function; Frequency response of systems, Fourier Transform, Laplace transform and z-transform with applications; Nyquist theorem for sampling of analog signals.					
5. Pre-requirements for this course (if any): 202EE-3 Engineering Mathematics					
6. Co- requirements for this course (if any): NA					
7	Course Main Ob	ioctivo(s)			

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Use the different theories to analyze:
 - i. Analog Signals
 - ii. Digital Signals
- 2. 2. Simulate the signal in both time and frequency domains.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	





4.	Tutorial	15
5.	Others (specify)	
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Distinguish between continuous and discrete time signal and systems.	1	LecturesTutorials	 Assignment Quizzes Midterm exam Final exam
1.2				
1.3				
1.4				
2.0	Skills			
2.1	Manipulate different signal transformation techniques.	6	- Lectures - Tutorials	 Assignment Quizzes Midterm exam Final exam
2.2	Evaluate fundamental signal and system parameters, such as energy, power and bandwidth.	6	 Simulation Lectures Tutorials 	- Quizzes - Assignment - Final exam
2.3	Assess continuous linear time invariant system response, analytically and using different techniques.	6	- Simulation - Lectures - Tutorials	ReportsQuizzesFinal exam
2.4				
3.0	Values, autonomy, and respon	sibility		
3.1				
3.2				
3.3				
3.4				





C. Course Content		
No	List of Topics	Contact Hours
1	Motivation, Signal Classifications, Signal Operations, Eigen Functions.	8
2	Theories of Fourier series for continuous and discrete time signals.	12
3	Linear circuits and system concepts, impulse response, convolution12and transfer function.12	
4	Frequency response of systems, Fourier Transform with applications	8
5	Laplace transform and z-transform with applications.	12
6	Nyquist theorem for sampling of analog signals. 8	
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Random	10
2.	Mid Exam 1	Week 6	20
3.	Mid Exam 2	Week 12	20
4.	Final Exam	At the end of the semester as determined by the academic calendar	50
-			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Oppenheim, Willsky and Nawab,"Signals and Systems", Pearson New International Edition 2015.
Supportive References	Signals, Systems, and Transforms, 4th Ed. C. L. Phillips, J. M. Parr, and E. A. Riskin, 2008.
Electronic Materials	Electronically lecture notes provided in e-board.
Other Learning Materials	MATLAB/Simulink

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum 20 students
Technology equipment (projector, smart board, software)	Laptops Data show MATLAB





Items	Resources
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Principles of Communication Systems
Course Code: 343EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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Others□

A. General information about the course:

Course Identification

1. Credit hours: 3 (3,0,1)

2. Course type

a. University □ College □ Department ⊠ Track □

b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 8th/4th

4. Course general Description

This course covers fundamental concepts of communication systems, which are essential for the understanding of advanced courses in digital/ wireless communications. Beginning with basic elements of Communication systems and Transmission through Systems and channels, the course will also cover several important modulation techniques such as Amplitude Modulation, Frequency Modulation, Phase Modulation etc., Superheterodyne receiver, Sampling process and Quantization, including Nyquist criterion and reconstruction of the original signal from the sampled signal, Pulse Modulation (PAM, PWM, PPM); TDM; Pulse Code Modulation (PCM); DPCM and DM. Further, the course will also cover concepts and advantages of Digital Communications, Line Coding (Binary Signaling), as well as Introduction to Digital Modulation (ASK, FSK, PSK).

5. Pre-requirements for this course (if any): Signals and Systems Analysis (342EE-3)

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Categorize components of communication system.
- 2. Make use of signal analysis techniques in communication systems.
- 3. Analyze linear systems in time and frequency domains.
- 4. Categorize modulations techniques.
- 5. Analyze simple modulation systems.
- 6. Categorize multiplexing techniques.
- 7. Identify and analyze pulse code modulation systems.
- 8. Describe and analyze delta modulation systems.
- 9. Explain digital modulation techniques.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10





No	Mode of Instruction	Contact Hours	Percentage
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Explain digital modulation techniques.	1	 Lectures Tutorials Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Final exam
1.2			-	-
1.3				
1.4				
2.0	Skills			
2.1	Analyze linear systems in time and frequency domains.	6	 Lectures Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Test 1 Final exam
2.2	Analyze analog modulation techniques.	6	 Lectures Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Test 2 Final exam





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.3	Evaluate fundamental communication system parameters.	6	 Lectures Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Test 1 Test 2 Final exam
2.4	Design Analog communication systems.	2	 Lectures MATLAB Making field trips to Najran for example, TV & Radio transmission station in order to help students to understand various concepts of the course topics 	 Group project Oral Presentation Final exam
3.0	Values, autonomy, and respon	sibility		
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	Lectures	- Mini project Report
3.2				
3.3				
3.4				

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to communication systems	4
2	Review of Signals and signal space	4
3	Analysis and Transmission of Signals	4
4	Amplitude Modulation and Demodulations	16
5	Angle Modulation & Demodulation	16
6	Sampling and Analog-to-Digital Conversion	8
7	Principles of Digital Data Transmission	8
	Total	60





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Communications Systems, Simon Haykin, John Wiley, 2010.	
Supportive References	 Modern digital and analog communication systems, B. P. Lathi, Zhing, 2010. Fundamentals of telecommunications, 2nd Edition, Roger L. Freeman, 2005. Telecommunication and Data Communications Handbook, Ray Horak, 2008. 	
Electronic Materials	None	
Other Learning Materials	Computer programing tools (MATLAB)	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum 20 students
Technology equipment (projector, smart board, software)	Laptops Data show MATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher





Assessment Areas/Issues	Assessor	Assessment Methods
		during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Electromagnetism II
Course Code: 344EE-2
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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A.	A. General information about the course:					
Co	urse Identificati	on				
1.	Credit hours:	2 (2,0,1)				
2.	Course type					
a.	University 🗆	College 🗆	Department⊠	Track□	Others□	
b.	Required 🗵	Elective				
3. off	Level/year at wl ered: 8 th /4 th	hich this course	eis			
 4. Course general Description This course covers forces due to magnetic fields, magnetic torque and moment, Magnetic dipole, magnetic boundary conditions, Inductors and inductances, magnetic energy and circuits. Time varying fields: Faraday's law, Transformer and motional emfs, Displacement current, Maxwell's equations and time harmonic fields, Wave equation, Power transfer and Poynting vector, Plane wave propagation in free space, in lossy dielectrics and in good conductors, Reflection of plane wave at normal and oblique incidences 5. Pre-requirements for this course (if any): Electromagnetism I (240EE-2) 						
6.	6. Co- requirements for this course (if any): NA					
7. (7. Course Main Objective(s)					

After completing this course the students should be able to:

- 1. Analyze forces due to magnetic fields, magnetic torque and moment.
- 2. Study magnetic dipole, magnetic boundary conditions.
- 3. Calculate inductances and magnetic energy.
- 4. Apply Faraday's law to analyze the transformer and motional EMFs.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	45	90
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	







B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Recognize magnetic torque, moment and boundary conditions.	1	LecturesTutorials	 Test 1 Assignment Quizzes Final exam
1.2				
1.3				
1.4				
2.0	Skills			
2.1	Analyze forces due to magnetic fields, magnetic energy and circuits	6	 Lectures Computer programing tools (MATLAB) Tutorials 	 Homework Assignment Quizzes Test 1 Final exam
2.2	Analyze the motional EMFs, time-varying electric and magnetic fields.	6	 Lectures Computer programing tools (MATLAB) Tutorials 	 Homework Assignment Quizzes Test 1 Final exam
2.3	Characterize the behavior of the wave propagation in reflection and refraction.	6	LecturesTutorials	 Test 2 Assignment Quizzes Final exam
2.4	Evaluate wave propagation in different types of materials.	6	 Lectures Computer programing tools (MATLAB) Tutorials 	 Homework Assignment Quizzes Test 2 Final exam
3.0	Values, autonomy, and respon	sibility		
3.1				
3.2				
3.3				





С	Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	3.4				

C. Course Content

No	List of Topics	Contact Hours
1	Forces due to magnetic fields, magnetic torque and moment	6
2	Magnetic dipole, magnetic boundary conditions	6
3	Inductors and inductances, magnetic energy and circuits	6
4	Faraday's law, transformer and motional emfs, displacement current, Maxwell's equations, time-harmonic fields.	6
5	Wave equation, wave propagation in lossy dielectrics	6
6	Plane wave propagation in lossless dielectrics, free space, and good conductor	6
7	Power transfer and Poynting vector.	4
8	Reflection of a plane wave at normal and oblique incidences.	5
	Total	45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Matthew N. O. Sadiku, "Elements of Electromagnetics", Oxford	
	Edition, 7th Edition, Saunders College, 2018.	
Supportivo Poforoncos	William H. Hayt, Jr. John A. Buck , "Engineering Electromagnetics"	
	Nineth Edition, 2019.	
Electronic Materials	Electronically lecture notes provided in e-board.	





Other Learning Materials None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum 20 students
Technology equipment (projector, smart board, software)	Laptops Data show MATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Computer Applications in Electrical Engineering
Course Code: 353EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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A. General information about the course:

Course Identification

1. Credit hours: 3 (2,1,1)

2. Course type

- a. University □ College □ Department ⊠ Track □ Others □
- b. Required ⊠ Elective□
- 3. Level/year at which this course is

offered: 7th/4th

4. Course general Description

Introduction to MATLAB system, generate matrices and perform operations on them, plot data, annotate graphs, create scripts and functions, construct and manipulate data structures, set up basic data analysis. Interacting Simulink Software with MATLAB, Creating a Simulink Model, Modeling a Dynamic Control System.

Introduction to LabVIEW virtual instruments (VIs), LabVIEW environments, creating, editing and debugging a VI, creating a sub VI, loops and charts, arrays, graphs, clusters, case and sequence structures, formula nodes.

5. Pre-requirements for this course (if any): Computer Programming for Engineers (204GE-3)

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Use the MATLAB GUI and development environment effectively.
- 2. Design programs to solve engineering and mathematical problems.
- 3. Build block diagrams in Simulink to model engineering systems.
- 4. Understand LabVIEW environment and use built in VI's.. Course Main Objective

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		





2. Contact Hours (based on the academic semester)			
No	Activity	Contact Hours	
1.	Lectures	45	
2.	Laboratory/Studio		
3.	Field		
4.	Tutorial	15	
5.	Others (specify)		
	Total	60	

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Formulate the MATLAB GUI.	1	Lectures and Problem-solving.	In class quizzes, Test and Final exam.
1.2				
1.3				
1.4				
2.0	Skills			
2.1	Carry out computations and visualize data in MATLAB.	6	 Offering extra tutorials for students Encourage class participation 	 Class participation Quizzes Midterm exams. Final Exams at the end of the semester.
2.2	Design programs to solve engineering and mathematical problems.	2	 Offering extra tutorials for students Encourage class participation 	 Class participation (Quizzes) Midterm exams. Home work Final Exams at the end of the semester.





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.3	Design graphical programming environment using LabVIEW	2	Class Lectures and Lab	 Mini-project Final Exams at the end of the semester.
2.4	Design Simulink models to simulate engineering systems.	2	Class Lectures and Lab	 Mini-project Final Exams at the end of the semester.
2.5	Communicate effectively to perform the presentation.	3		• Class Lectures and Lab
3.0	Values, autonomy, and respon	sibility		
3.1	Perform as an effective team- player in executing related project with imposed design constraints.	5		Class Lectures and Lab
3.2	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	Lectures	 Mini project Report
3.3				
3.4				

C. Course Content

No	List of Topics	Contact Hours		
1	Introduction to MATLAB system	4		
2	Generate matrices and perform operations on them	8		
3	Plot data, annotate graphs,	8		
4	Construct and manipulate data structures	12		
5	Set up a basic data analysis	8		
6	Creating a Simulink Model, Modeling a Dynamic Systems.	8		
7	7 Introduction to LabVIEW, virtual instruments, LabVIEW environments,			
8	8 Creating, editing and debugging a VI, creating a sub VI, loops and charts.			
	60			





D. Students Assessment Activities						
No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score			
1.	Quiz 1	Week 4	5 %			
2.	Quiz 2	Week 7	5 %			
3.	Midterm	Week 10	30 %			
4.	Homework, Mini-project and presentation	Week 13	10 %			
5.	Final Exam (Practical)		20 %			
6.	Final Exam (Theoretical)	At the end of the semester as determined by the academic calendar	30 %			
-						

7.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities 1. References and Learning Resources

Essential References	Holly Moore, MATLAB for Engineers, 3/E, ISBN-10: 0132103257, ISBN-13: 9780132103251, Prentice Hall, 2012.					
Supportive References		nald W. Larsen,	LabVIEW f	or Enginee	rs, ISBN-10: 01	36094295,
		ISBN-13: 9780136094296, Prentice Hall, 2011.				
Electronic Materials	None					
Other Learning Materials	•	MATLAB www.mathwo	2016a <u>rks.com</u>	with	Simulink	Software.
		www.ni.com/l	LabVIEW	nanuai, Co	ourse software v	ersion 2011,

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Computer Lab with a maximum capacity of 20 students
Technology equipment (projector, smart board, software)	 20 PC terminals Laptops Data show MATLAB/Simulink LabVIEW
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Introduction to microprocessor
Course Code: 354EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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G. Specification Approval Data			





A. General information about the course.	Α.	General	information	about the	course:
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Course Identification		
	One dit is a una u	0 (0 0 4)

1. Credit hours: 3 (3,0,1)

2. Course type

- a. University □ College □ Department ⊠ Track □ Others □
- b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 8th/4th

4. Course general Description

Microprocessors architecture; Addressing modes and techniques; Instruction set; Assembly language programming; Interrupt systems; Input/output devices and timing; Memory devices; Future trends in microprocessors.

- 5. Pre-requirements for this course (if any): 251EE-3 Digital Logic Design
- 6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Describe the major components of a computer system and state their function and purpose.
- 2. Recognize the hardware and software model of microprocessors.
- 3. Identify addressing modes, instruction set of microprocessors.
- 4. Demonstrate the ability to program a microprocessor in assembly language.
- 5. Identify interrupt, memory and input/output interfaces

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage		
1.	Traditional classroom	60	100		
2.	E-learning				
3.	HybridTraditional classroomE-learning				
4.	Distance learning				
2. Contact Hours (based on the academic semester)					
No	Contact Hours				

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Identify the computer system and the 8086 architecture model	1	LecturesTutorials	 Assignment Quizzes Test 1 Final exam
1.2	Identify memory, i/o devices and interfaces, and the interrupt.	1	- Lectures - Tutorials	 Assignment Quizzes Test 1 Final exam
2.0	Skills			
2.1	Classify addressing modes and the instruction set.	6	- Lectures - Tutorials	 Assignment Quizzes Test 2 Final exam
2.2	Demonstrate the ability to program using the assembly language.	6	LecturesTutorials	 Assignment Quizzes Test 2 Final exam
3.0	Values, autonomy, ar	nd responsibility		
3.1				

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to microprocessors and microcomputers	8
2	Software architectures of the 8088 and 8086 microprocessors.	8
3	Assembly language programing	16
4	The 8086 microprocessor programing instructions and program structures.	16
5	The 8086 microprocessor and their memory and input/output interfaces.	8
6	Modern microcontrollers like Arduino.	4
	60	




D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Walter A. Triebel and Avtar "Singh The 8088 and 8086 Microprocessors: Pearson New International Edition: Programming, Interfacing, Software, Hardware, and Applications",2013
Supportive References	The 80X86 IBM PC and Compatible Computers: Assembly Language, Design, and Interfacing Volumes I & II", Prentice Hall.
Electronic Materials	http://lib.nu.edu.sa/ http://lms.nu.edu.sa/
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum 20 students
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor Assessment Me	
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form. [Indirect]
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate. [Indirect]
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus. [Indirect]
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software [Direct]
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Microprocessor Lab
Course Code: 355EE-1
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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A. General information about the course:					
Со	ourse Identificati	on			
1.	Credit hours:	1 (0,2,0)			
2.	Course type				
a.	University 🗆	College 🗆	Department⊠	Track□	Others□
b.	Required 🗵	Elective□			
3. off	Level/year at wl ered: 8 th /4 th	hich this cours	e is		
 4. Course general Description Microprocessors architecture; Addressing modes and techniques; Instruction set; Assembly language programming; Interrupt systems; Input/output devices and timing; Memory devices; Future trends in microprocessors; Modern microcontrollers like Arduino. 5. Pre-requirements for this course (if any): NA 					
6. Co- requirements for this course (if any): Introduction to Microprocessor, 354EE-3					
7. Course Main Objective(s) After completing this course the students should be able to:					
	 Identify the 8086 training kit and demonstrate the basic operations and assembly commands. 				

- 2. Develop microprocessors arithmetic and logic instructions.
- 3. Implement hardware interfaces to practical systems.
- 4. Recognize the microprocessor interrupts.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		
2. Contact Hours (based on the academic semester)			

No	Activity	Contact Hours
1.	Lectures	
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	





Total

20

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding	<u> </u>	
1.1	Identifythe8086trainingkitanddemonstratethebasic operationsandassembly commands.	1	- Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.0	Skills			
2.1	Design a program for microprocessors arithmetic and logic instructions.	2	Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.2	Implement hardware interfaces to practical systems.	6	- Lab demonstration	 Quizzes Lab Report Test 1 Final exam
2.3	Communicate effectively in group discussion.	3	- Lab demonstration	 Lab Report Oral Examination
3.0	Values, autonomy, ar	nd responsibility		
3.1	Work effectively as a member of the team.	5	Lab demonstration	Lab Report
3.2	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Experiment	- Reports

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to 8086 microprocessors	6
2	Experiment #1: Introduction to MDA – 8086 Training Kit	2
3	Experiment #2: Basic operations of MDA 80x86 trainer kit	2
4	Experiment #3: different commands of MDA 80x86 trainer Kit	4
5	Experiment #4: Explore kit mode functionality	4
6	Experiment #5: Explore PC mode functionality	2





7	Experiment #6: Write a program to display the digits in decimal, from 0-7 into 7-segment	2
8	Experiment #7: initialize DOT MATRIX DISPLAY	2
9	Experiment #8:A/D convertor application	2
10	Experiment #9:D/A convertor application	2
11	Experiment #10: Modern microcontrollers like Arduino	2
	30	

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 8	20 %
2.	Quizzes	Every lab	10 %
3.	Lab Report	Every lab	20 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5.			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Walter A. Triebel and Avtar "Singh The 8088 and 8086
Supportive References	Microprocessors: Pearson New International Edition: Programming, Interfacing, Software, Hardware, and Applications",2013
Electronic Materials	Lab notes are delivered to the students through online portal "Blackboard"
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lab for maximum 10 students
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor Assessment Me	
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form. [Indirect]
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate. [Indirect]
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus. [Indirect]
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software [Direct]
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023







Course Specification





T-104 2022

Course Specification

Course Title: Automatic Control
Course Code: 361EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 1
Last Revision Date: 06/06/2022G





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A.	A. General information about the course:					
Co	ourse Identificati	on				
1.	Credit hours:	3 (3,0,0)				
2.	Course type					
a.	University 🗆	College 🗆	Depar	tment⊠	Track□	Others□
b.	Required ⊠	Elective□				
3. off	Level/year at wh ered: 11 th /3 rd	nich this cours	e is			
4. Course general Description Review of mathematical background (complex variables, Laplace, Diff. Equations); System representation (block diagram, transfer functions, signal flow graph) Modeling of electric and mechanical systems; State variable analysis; Stability; Time domain analysis; Root locus; Frequency domain analysis; Introduction to PID control.						
5. Pre-requirements for this course (if any): 342EE-3 Signal and Systems Analysis						
6. Co- requirements for this course (if any): NA						
7. Aft	7. Course Main Objective(s) After completing this course the students should be able to:					

- 1. Represent a system using (block diagram, transfer functions, signal flow graph)
- 2. Analyze a system both Time domain and Frequency domain
- 3. Construct the state-space model
- 4. Evaluate the control system stability

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	60
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Teaching Assessment Strategies Methods	
1.0	Knowledge and understanding				
1.1	Represent a system using block diagram, transfer functions, signal flow graph.	1	- Class Lectures, MATLAB programming	- Quizzes, Mid Term Exams, Final Exam	
2.0	Skills				
2.1	Design and analyze a system both in time domain and frequency domain	2	- Class Lectures	 Quizzes, Mid Term Exams, Mini-Project Final Exam 	
2.2	Evaluate the control system stability	6	- Class Lectures,	- Quizzes, Mid Term Exams, Final Exam	
2.3	Construct the state- space model	6	Class Lectures	Quizzes, Mid Term Exam, Final Exam	
3.0	Values, autonomy, ar	nd responsibility			
3.1	Perform as an effective team-player in executing related project with imposed design constraints.	5	Class Lectures	Mini-project	
3.2	Communicate effectively to perform the presentation.	3	Class Lectures	Presentation	





No	List of Topics	Contact Hours
1	Introduction to Control Systems	4
2	Differential Equations of Physical Systems	4
3	Transfer Function of Linear Systems-Block Diagram Models-Signal Flow Graphs [SFG]	10
4	State Variable Models- SFG State Models-TF from State Equations- State Transition Matrix	4
5	Performance of Feedback Control Systems	4
6	Stability of Linear Feedback Systems	4
7	Root Locus Technique.	6
8	Frequency Response Method & Stability in the Frequency Domain.	4
9		
10		
11		
12		
	Total	60

Course Content

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Random	6 %
2.	Mini Project and presentation	Week 8	4 %
3.	Mid Term 1 Exam	Week 5	20 %
4.	Mid Term 2 Exam	Week 9	20 %
5.	Final Exam	Week 12	50 %
0			

6.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities 1. References and Learning Resources

Essential References	Modern Control Systems, by Richard C. Dorf and Robert H.	
	Bishop, Pearson Education, 15. October 2013.	
Supportive References	 Modern Control System Theory and Design 2nd edition, Stanley Shinner, Interscience, 1998. Automatic Control Systems, Benjamin Kuo, Prentice-Hall, 2002. Control System Engineering, by Normon S Nise, 2008. 	
Electronic Materials	Youtube channel for control concepts	
Other Learning Materials	Lecture notes	





2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom
Technology equipment (projector, smart board, software)	White Board, Smart Board
Other equipment (depending on the nature of the specialty)	Students use their own Laptops with software Matlab to complete mini project

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14431106-0026-00007
DATE	06/06/2022











T-104 2022

Course Specification

Course Title: Automatic Control Lab
Course Code: 362EE-1
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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A. General information about the course:

1. Credit hours: 1 (0,2,0)

2. Course type

- a. University □ College □ Department⊠ Track□ Others□
- b. Required ⊠ Elective□
- 3. Level/year at which this course is

offered: 8th/4th

4. Course general Description

Experiments to support control theory using physical processes (e.g. water level, temperature control, light intensity control, etc); Control system simulation using Matlab; Modeling of physical (experimental) equipment; Static performance; Transient analysis; Measuring devices; Two-position control; Proportional control; PID control.

5. Pre-requirements for this course (if any): NA

6. Co- requirements for this course (if any): Automatic control (361EE-3)

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. It is concerned with modern control techniques.
- 2. Student learns how to run Experiments include system identification, dynamic analysis of control systems with application to level, temperature, flow and pressure controls, PID tuning, and typical process control systems.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	
2.	Laboratory/Studio	30
3.	Field	





4.	Tutorial	
5.	Others (specify)	
	Total	30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understa			
1.1				
1.2				
1.3				
1.4	Skille			
2.0	Analyze the control system using MATLAB simulation tools.	6	 Experiment procedure explanation Computer programing tools (MATLAB) and Cassy Lab verification 	 Lab report Mid-term exam Final exam
2.2	Analyze the control system using Cassy-Lab real-time simulation tools.	6	 Experiment procedure explanation Computer programing tools (MATLAB) and Cassy Lab verification 	 Lab report Mid-term exam Final exam
2.3	Analyze PID and two- position controller.	6	 Experiment procedure explanation Computer programing tools (MATLAB) and Cassy Lab verification 	 Lab report Mid-term exam Final exam
2.4	Verify modern control concepts	6	 Team work on Getting the experiment results Oral presentation of selected experiments Final exam 	 Lab report Mid-term exam -Final exam
2.5	Communicate effectively in group discussion and oral examination.	3	- Experiment -	 Lab Performance and oral examination
3.0	Values, autonomy, and re	esponsibility		
3.1				
3.2				





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.3	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Experiment	- Reports
3.4	Work effectively as a member of the team.	5	- Experiment	Lab Performance and oral examination

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to the Computer-Aided Design Package MATLAB	2
2	Simulation of a Prototype Second Order System	2
3	Real-Time Simulation of the Second Order System using Cassy-Lab	2
4	Unit Step Response of Proportionate, Integrator and Differentiate Controller	4
5	PID Controller	4
6	Air Flow Control	4
7	Light Intensity Control	4
8	Temperature Control	4
9	Water level and flow rate control	4
10		
11		
12		
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Reports	Every experiment	20%
2.	Pre-lab Quiz	Every experiment	10%
3.	Mid Term Exam	Week 8	20%
4.	Final Exam	End of the semester	50%
-			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)





E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Dorf and R. Bishop "Modern Control Systems", Addison-Wesley, 1998.
Supportive References	Lab Manuals.
Electronic Materials	None
Other Learning Materials	MATLAB tutorials

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lab for maximum 20 students
Technology equipment (projector, smart board, software)	 Laptops Data show MATLAB
Other equipment (depending on the nature of the specialty)	-

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of teacher during class and assessed him by filling the peer reviewer assessment form.
Effectiveness of students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback of syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)





Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title Energy Efficiency
Course Code: 419EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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F. Assessment of Course Qualit		
G. Specification Approval Data		





A. General information about the course:						
С	ourse Identificati	on				
1.	Credit hours:	3 (3,1,1)				
2.	Course type					
a.	University	College 🗆	Departm	ent⊠	Track□	Others□
b.	Required	Elective⊠				
3. of	Level/year at wh fered: 10 th /5 th	hich this course	is			
 4. Course general Description This course will provide the student with a practical understanding of the energy efficiency measures which can be implemented by large and medium industrial and commercial energy users, and domestic users. It will cover energy technologies including energy auditing, rate structures, economic evaluation techniques, lighting efficiency improvement, HVAC optimization, combustion and use of industrial waste, steam generation, distribution system performance, process energy management, and maintenance considerations. 5. Pre-requirements for this course (if any): 418EE-3 Renewable Energy System 						

7. Course Main Objective(s)

After completing this course, the students should be able to:

1. Identify and describe the energy conservation opportunities in industrial and commercial systems

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	15
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Identify and describe the energy conservation opportunities in industrial and commercial systems.	1	LecturesTutorials	 Test 1 Test 2 Homework Assignment Quizzes Final exam
1.2	Describe the energy rate structures.	1	LecturesTutorials	QuizzesTest 2Final exam
1.3	Use advanced technology to monitor and control energy use.	7	LecturesTutorials	-
2.0	Skills	H	H	
2.1	Present energy efficiency and demand management projects and proposals.	6	LecturesTutorials	QuizzesTest 1Final exam
2.2	Apply energy auditing techniques.	6	LecturesTutorials	 Quizzes Test 2 Final exam
2.3				
3.0	values, autonomy, ar	nd responsibility		
3.1	Examine the economic evaluation of energy conservation solutions.	4	LecturesTutorials	 Homework Assignment Quizzes Final exam





No	List of Topics	Contact Hours
1	Introduction to energy efficiency and conservation measures, low cost/ no cost energy conservation measures.	4
2	Energy management program.	8
3	The energy audit process.	8
4	Understanding energy bills.	8
5	Lighting, heating, ventilation, and air conditioning.	8
6	Energy efficiency in pumps, fans, motors, belt drives, variable speed/frequency drives.	8
7	Combustion process and industrial waste.	8
8	Control systems & computers to monitor energy use.	8
	Total	60

Total

C Course Content

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Kennedy, William J., Turner, Wayne C., and Capehart, Barney L. Guide to Energy Management, The Fairmount Press, 8 th edition, 2016.
Supportive References	 Stephen W. Fardo, Dale R. Patrick, Ray E. Richardson and Brian W. Fardo. Energy Conservation Guidebook, 3rd Edition. Steve Doty and Wayne C. Turner. Energy Management Handbook, 8th Edition.
Electronic Materials	None
Other Learning Materials	- MATLAB Program.





2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Electrical Machines II	
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Course Code: 420EE-3

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. General mormation about the course	Α.	General	information	about the	course:
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Course	Identification
000100	aontinoution

1. Credit hours: 3 (3,0,1)

2. Course type

- a. University
 College
 Department
 Track
 Others
- b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 9th/ 5th

4. Course general Description

Synchronous machines (construction, internal voltage, equivalent circuit, Phasor diagram, performance of turbo-alternator, generator operating alone, parallel operation of AC generators, synchronous motor, steady-state operation, starting), DC machines (construction, classification, performance, motor characteristics, starting of DC motors, speed control of DC motors).

- 5. Pre-requirements for this course (if any): 320EE-3 Electrical Machines I
- 6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course, the students should be able to:

- 1. To understand the basic principles of DC and synchronous machines.
- 2. To know the operation and testing of DC and synchronous machines

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	





60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Total

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods	
1.0	Knowledge and understanding				
1.1	Classify the synchronous machines and dc machines.	1	LecturesTutorials	 Test 1 , Test 2 Quizzes Final exam 	
1.2	Explain the principle of operation of synchronous generators, motors and dc machines.	1	- Lectures - Tutorials	 Test 1 , Test 2 Quizzes Final exam 	
1.3					
1.4					
2.0	Skills				
2.1	Analyze the performance of synchronous machines and dc machines	6	- Lectures - Tutorials	- Test 1 , Test 2 - Quizzes - Final exam	
2.2	Design the equivalent circuits of synchronous machines and dc machines.	2	- Lectures - Tutorials	- Test 1 , Test 2 - Quizzes Final exam	
2.3					
2.4					
3.0	Values, autonomy, ar	nd responsibility			
3.1					
3.2					
3.3					
3.4					




No	List of Topics	Contact Hours
1	Introduction to synchronous machines and its construction ,Voltage Induced in the Armature Winding of Synchronous Machine, Equivalent Circuit of Synchronous Machine and its Phasor Diagram, Performance of Synchronous Generator	16
2	Synchronous Generator Operating Alone, Parallel Operation of Synchronous Generators	16
3	Synchronous Motor Analysis, Steady State Operation, Starting.	8
4	Introduction to DC Machines and its construction, Classification of DC Machines, DC Generators Operation and Performance.	8
5	DC Motors Characteristics, Starting of DC Motors.	12
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes, Report	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Stephen J Chapman, Electrical Machinery Fundamentals, Publisher: McGraw-Hill Higher Education, 2011, 5 th Edition.
Supportive References	 Principles of Electric Machines and Power Electronics, P. C. Sen, John Wiley &Sons, second edition, 1997. Denis O'Kelly, Performance and Control of Electrical Machines, Publisher: Mc-Graw Hill Book Company, 1991. Karsai, D Kereny, L Kiss, Studies in Electrical and Electronic. Engineering 25, Large Power Transformers, Publisher: Elsevier, 1987 A E Fitzgerald, Charles Kingsley, Stephen D Umans, Electric Machinery, Sixth Edition, Publisher: Mc-Graw-Hill Higher Education, 2002. Charles I Hubert, Electric Machines, Theory, Operation, Application, Adjustment and Control, Publisher: Macmillan Publishing Company, 1991.





	 Dino Zorbas, Electric Machines, Principles, Applications, and Control Schematics, Publisher: West Publishing Company, 1989.
Electronic Materials	None
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	- Laptops Data show
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching and assessment	Students	 Questionnaire is administered upon completing the course syllabus. Open discussion for the students during the semester to recognize their weak points in the course. Feedback from Test 1, Test 2 and Final exam records.
Evaluation of teaching	Peer reviewer	The peer reviewer will monitor a teaching session for assessment by filling the peer reviewer assessment form.
Extent of students' achievement of course learning outcomes	Teaching staff	CLOSO program.
Improvement of teaching	- Students Peer reviewer	 Learning from students feedback. Learning from peer reviewer and department feedback.





Assessment Areas/Issues	Assessor	Assessment Methods
		- Learning/Using various teaching methods (lectures, discussions, workshops, exams). Learning/Using various teaching mediums (projector, whiteboard, videos, educational visits).
Quality of learning resources	Students	Questionnaire is administered by the end of every semester.
Verifying standards of student achievement	- Program leader Independent member teaching staff	Check student's marks by an independent teaching staff member /program leader a sample of student work and remark tests or a sample of assignments.

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Code: 421EE-1

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. General information about the course:

|--|

1. Credit hours: 1 (0,2,0)

2. Course type

- a. University □ College □ Department⊠ Track□ Others□
- b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 9th/5th

4. Course general Description

Hands-on exercises to set up circuits along with measurement and observation capabilities to explore the operating principles and characteristics of transformers, DC and AC Motors and Generators.

5. Pre-requirements for this course (if any): 420EE-3 Electrical Machines II

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course the students should be able to:

1. Gain an engineering appreciation of electrical machines' operation and their applications.

2. Develop practical skills for measuring electrical and mechanical quantities (Current, voltage, power, efficiency, regulation, torque, speed)

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100%
2.	E-learning	-	-
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1			-	-
1.2			-	-
1.3				
1.4				
2.0	Skills		H	4
2.1	Performtheexperimentforoperatingcharacteristicsoftransformers.	6	 Pre-lab lectures Experiment Computer programing tool (Multisim) 	 Reports Quizzes Midterm exam Final exam
2.2	Obtain the operating characteristics of rotating machines.	6	 Pre-lab lectures Experiment Computer programing tool (Multisim) 	- Reports - Quizzes Final exam
2.3	Measure torque, power and parameters of electrical machines.	6	 Pre-lab lectures Experiment Computer programing tool (Multisim) 	- Reports - Quizzes Final exam
2.4	Communicate effectively in group discussion and oral examination.	3	- Experiment	Lab Performance and oral examination
3.0	Values, autonomy, ar	nd responsibility		
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Experiment	- Reports
3.2	Work effectively as a member of the team.	5	- Experiment	Lab Performance and oral examination
3.3				
3.4				





C. Course Content

No	List of Topics	Contact Hours
1	Experiments with the Single-phase Transformer, Voltage and Current Transformation, Voltage Behavior with Resistive Load, Evaluating Efficiency	4
2	Experiments with the Single-phase Transformer, Equivalent circuit of transformer, Open circuit test, Short circuit test	4
3	Three-phase transformer, voltage regulation, efficiency.	4
4	DC machines starting and loading tests.	2
5	Squirrel-cage induction motor, Locked-rotor test, No-load test, DC Test	4
6	Squirrel-cage induction motor, Torque-speed characteristics.	4
7	Synchronous generator, Measurement of no-load characteristics, Measurement of short-circuit characteristics, Measurement of load characteristics, Measurement of circuit parameters.	4
8	Synchronous motor, Synchronous motor as mechanical driver, Synchronous motor as compensator	4
9		
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Pre-Lab Quiz	Every Week/Experiment	10 %
2.	Report	Every Week/Experiment	10 %
3.	Lab Performance	Every Week/Experiment	10 %
4.	Midterm Exam	Week 8	20%
5.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
0			

6.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities 1. References and Learning Resources

Essential References	Stephen J Chapman, Electrical Machinery Fundamentals, McGraw-Hill Higher Education, 2011, 5 th Edition.
Supportive References	A E Fitzgerald, Charles Kingsley, Stephen D Umans, Electric Machinery, Sixth Edition, Mc-Graw-Hill Higher Education,





	2002.Electronic Devices and Circuit Theory (7th ed.) by R. Boylestad and L. Nashelsky.	
Electronic Materials	None	
Other Learning Materials	None	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum for 15 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching and assessment	Students	 Questionnaire is administered upon completing the course syllabus. Open discussion for the students during the semester to recognize their weakness points in the course. Feedback from Midterm and Final exam records.
Evaluation of teaching	Peer reviewer	The peer reviewer will monitor a teaching session for assessment by filling the peer reviewer assessment form.
Extent of students' achievement of course learning outcomes	Teaching staff	CLOSO program.
Improvement of teaching	- Students Peer reviewer	 Learning from students feedback Learning from peer reviewer and department feedback.





Assessment Areas/Issues	Assessor	Assessment Methods
		 Learning/Using various teaching methods (lectures, discussions, workshops, exams). Learning/Using various teaching mediums (projector, whiteboard, videos, educational visits)
Quality of learning resources	Students	Questionnaire is administered by the end of every semester
Verifying standards of student achievement	- Program leader Independent member teaching staff	Check student's marks by an independent teaching staff member /program leader a sample of student work and remark tests or a sample of assignments.

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title:	Power System Analysis I
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Course Code: 424EE-3

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. General information about the course:					
Co	urse Identificat	ion			
1.	Credit hours:	3 (3,0,1)			
2.	Course type				
a.	University 🗆	College 🗆	Department⊠	Track□	Others□
b.	Required 🛛	Elective□			
3. Level/year at which this course is offered: 9 th / 5 th					
4. Course general Description Power system components and representation; Transmission line and cable parameters; Analysis of transmission and distribution lines; Power factor correction, Electric insulators; Grounding systems					
5. Pre-requirements for this course (if any): 217EE-3 Electrical Circuits II					
6. Co- requirements for this course (if any): NA					

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. To understand basic concepts in power system.
- 2. To conduct power transmission and distribution calculations.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	57	95
2.	E-learning	03	5
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Recognize power system structure and operation.	7	LecturesTutorials	HomeworkQuizzesFinal exam
1.2	Recognize electrical insulators and power system grounding.	7	- Lectures - Tutorials	- Homework - Quizzes - Final exam
1.3				
1.4				
2.0	Skills			
2.1	Analyze transmission lines performance.	6	LecturesTutorials	HomeworkTest 1Final exam
2.2	Design per-unit model of power systems.	2	- Lectures - Tutorials	- Homework - Quizzes - Test 2 Final exam
2.3				
2.4				
3.0	Values, autonomy, ar	nd responsibility		
3.1				

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to electrical energy systems	6
2	Analysis of single-phase and three-phase circuits	4
3	Calculation of transmission line parameters	6
4	Transmission lines modeling and performance evaluation	16
5	Electrical insulators	8
6	Grounding systems	8
7	Power factor correction	6
8	Introduction to power system modeling and per-unit system	6
	Total	60





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	16 %
2.	Test 2	Week 12	16 %
3.	Assignments/Quizzes/grou project and presentation	Every chapter	18 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
~			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Power System Analysis, John J. Grainger and William D. Stevenson, JrMcGraw-Hill, 1994.
Supportive References	Husain, "Electrical power Systems", CBS Publisher & Distributors, 1994.
Electronic Materials	None
Other Learning Materials	Computer programing tools (MATLAB)

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for 20 students.
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching and assessment	Students	 Questionnaire is administered upon completing the course syllabus. Open discussion for the students during the semester to recognize their weak points in the course.





Assessment Areas/Issues	Assessor	Assessment Methods
		Feedback from Test 1, Test 2 and Final exam records.
Evaluation of teaching	Peer reviewer	The peer reviewer will monitor a teaching session for assessment by filling the peer reviewer assessment form.
Extent of students' achievement of course learning outcomes	Teaching staff	CLOSO program.
Improvement of teaching	- Students Peer reviewer	 Learning from students feedback. Learning from peer reviewer and department feedback. Learning/Using various teaching methods (lectures, discussions, workshops, exams). Learning/Using various teaching mediums (projector, whiteboard, videos, educational visits).
Quality of learning resources	Students	Questionnaire is administered by the end of every semester
Verifying standards of student achievement	- Program leader Independent member teaching staff	Check student's marks by an independent teaching staff member /program leader a sample of student work and remark tests or a sample of assignments.

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Power Systems lab	
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Course Code: 425EE-1

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. General information about the course:						
Course Identification						
1.	Credit hours:	1 (0,2,0)				
2.	Course type					
a.	University	College 🗆	Dep	partment⊠	Track□	Others□
b.	Required 🗵	Elective□				
3. of	Level/year at wl fered: 9 th /5 th	hich this cours	e is			
This tab course includes ten experiments to study various aspects of power systems: measurement of the characteristics data of a transmission line and an assessment of its voltage drop and losses; synchronization and steady state operation of a generator connected to an infinite bus system; load characteristics of a synchronous motor and effect of field excitation on reactive power load; effect of voltage levels on power transmission and effects of various load types on power plants; load flow data preparation and system study; analysis of symmetrical and unsymmetrical faults; power factor correction; performance and connections of power transformers						
Ι						
6. Co- requirements for this course (if any): NA						
7. Af	Course Main Ob ter completing this	jective(s) course the stude	ents sh	nould be able to	D:	

- 1. To understand basic concepts in power system.
- 2. To conduct experimental work.
- 3. To measure electrical quantities and analyze data.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No Activity Contact Hour







B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understand	ing		
1.1			-	-
1.2			-	-
1.3				
1.4				
2.0	Skills			
2.1	Analyze the effect of active and reactive loading on the voltage drop and the power handling capability of a transmission line.	6	 Pre-lab lectures Experiment 	 Written report, quizzes and Exams
2.2	Experiment paralleling of generators and connecting a generator to the grid	6	Pre-lab lecturesExperiment	Written report, quizzes and Exams
2.3	Carry out a short circuit analysis study for symmetrical and unsymmetrical faults and interpret the results of the analysis.	6	 Pre-lab lectures Experiment 	Written report, quizzes and Exams
2.4	Measure and calculate: complex power, real and reactive power; lagging and leading power factor, apparent power	6	 Pre-lab lectures Experiment 	Written report, quizzes and Exams
2.5	Manipulate the control of voltage, frequency, and power of an AC generator	6	 Pre-lab lectures Experiment 	Written report, quizzes and Exams
2.6	Practicetheprocedureusedinpreparingtransmission line, load and	6	 Pre-lab lectures Experiment 	Written report, quizzes and Exams





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	generator data for a load flow system study.			
2.7	Communicate effectively in group discussion and oral examination.	3	- Experiment	Lab Performance and oral examination
3.0	Values, autonomy, and resp	oonsibility		
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Experiment	- Reports
3.2	Work effectively as a member of the team.	5	- Experiment	Lab Performance and oral examination
3.3				
3.4				

C. Course Content

No	List of Topics	Contact Hours
1	Transmission line model and voltage drop evaluation	2
2	Load characteristics of a synchronous motor	2
3	Load effect on power plants	2
4	Phase sequence measurements	2
5	Power factor correction	4
6	Synchronizing an alternator and connecting it to the power system	2
7	Real and reactive power control of an alternator	4
8	Writing Matlab subroutines to solve the load-flow problem.	4
9	Using commercial software to determine fault currents and voltages in 14-bus system	4
10	Three-phase transformer connections.	4
11		
12		
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Pre-lab quiz	weekly	10%





No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
2.	Lab report	weekly	10 %
3.	Lab performance	weekly	10 %
4.	midterm exam	Week 8	20 %
5.	Final Term exam	End of the semester	50 %
6			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Power System Analysis, John J.Grainger and William D. Stevenson, JrMcGraw-Hill, 1994.
Supportive References	Husain, "Electrical power Systems", CBS Publisher & Distributors, 1994.
Electronic Materials	None
Other Learning Materials	Computer programing tools (MATLAB)

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Laboratory equipped with adequate experimental facilities.
Technology equipment (projector, smart board, software)	-
Other equipment (depending on the nature of the specialty)	-

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching and assessment	Students	 Questionnaire is administered upon completing the course syllabus. Open discussion for the students during the semester to recognize their weak points in the course. Feedback from Tests and Final exam records.





Assessment Areas/Issues	Assessor	Assessment Methods
Evaluation of teaching	Peer reviewer	The peer reviewer will monitor a teaching session for assessment by filling the peer reviewer assessment form.
Extent of students' achievement of course learning outcomes	Teaching staff	CLOSO program.
Improvement of teaching	- Students Peer reviewer	 Learning from students feedback. Learning from peer reviewer and department feedback. Learning/Using various teaching methods (lectures, discussions, workshops, exams). Learning/Using various teaching mediums (projector, whiteboard, videos, educational visits).
Quality of learning resources	Students	Questionnaire is administered by the end of every semester
Verifying standards of student achievement	- Program leader Independent member teaching staff	Check student's marks by an independent teaching staff member /program leader a sample of student work and remark tests or a sample of assignments.

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Electrical Drives
Course Code: 430EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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A. General information about the course:					
Сс	ourse Identificati	ion			
1.	Credit hours:	3 (3,0,1)			
2.	Course type				
a.	University	College □	Department⊠	Track□	Others□
b.	Required	Elective⊠			
3. Level/year at which this course is offered: 9 th /5 th					
4. Course general Description Principles of electric drive; Definitions; Electrical considerations: running, starting, braking; Mechanical considerations: type of enclosure, noise, drive transmission, motor selection; Electric traction; DC & AC solid state drives.					
5. Pre-requirements for this course (if any): Electrical Machines II (420EE-3)					
6. Co- requirements for this course (if any): NA					

7. Course Main Objective(s)

After completing this course, the students should be able to:

- 1. Recognize the structure and operation of different types of electric drive systems.
- 2. Study the characteristics and use of electric drives.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	57	95
2.	E-learning	3	5
3.	HybridTraditional classroomE-learning		
4.	Distance learning		
2. Cor	ntact Hours (based on the a	cademic semester)	
No	Activ	ity	Contact Hours
1.	Lectures		45
2.	Laboratory/Studio		
3.	Field		

4.Tutorial155.Others (specify)60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning	Code of CLOs aligned	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Define and classify the different electrical machines and drive systems.	1	Lectures Tutorials	 Homework Assignment Quizzes Final exam
1.2				
2.0		Skills	4	
2.1	Analyze solid state power electronic circuits for DC and AC drive systems.	6	Lectures Tutorials	 Homework Assignment Quizzes Test 2 Final exam
2.2	Design models of DC, AC motors and speed controller.	2	Lectures Tutorials	 Mini project presentation Assignment Quizzes Test 2 Final exam
2.3	Analyze the AC motor speed controller.	6	Lectures Tutorials	 Assignment Quizzes Test 2 Final exam
2.4	Communicate effectively to perform the presentation.	3	Lectures Tutorials	Mini ProjectPresentation
2.5				-
2.6				-
3.0	Values, autonomy, ar	nd responsibility		
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Lectures Tutorials	- Mini project Report
3.2	Perform as an effective team-player in executing related project with imposed design constraints.	5	- Lectures Tutorials	- Mini project
3.3				





No	List of Topics	Contact Hours
1	Introduction to electrical drives and solid-state power converters.	6
2	Basic components of electrical drive systems.	4
3	Analysis of the basic criterion of selecting an electric motor for a given drive system.	6
4	DC solid state drive systems.	18
5	AC solid state drive systems.	18
6	Application of control methods to regulate motor speed, position, and torque.	8
7		
8		
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	15 %
2.	Test 2	Week 12	15 %
3.	Assignments/Quizzes/Mini project and presentation	Every chapter	20 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
-			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Krishnan, "Electric Motor Drives", Prentice Hall, 2001. Electrical Machines and Drives, Melkebeek, Jan, Springer, 2018
Supportive References	Theodore Wildi, "Electrical Machines, Drives, and Power Systems", 6 Th Edition, 2006.
Electronic Materials	http://lib.nu.edu.sa/digitallibbrary.aspx
Other Learning Materials	Computer programing tools (MATLAB)





2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title Power System Protection		
Course Code: 431EE-3		
Program: Bachelor of Science in Electrical Engineering		
Department: Electrical Engineering		
College: Engineering		
Institution: Najran University		
Version: 2		
Last Revision Date: 22/08/2023G		





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A.	General infor	mation abou	it the course:		
Сс	ourse Identificati	on			
1.	Credit hours:	3 (3,0,1)			
2.	Course type				
a.	University 🗆	College 🗆	Department⊠	Track□	Others□
b.	Required	Elective			
3. of	Level/year at wl ered: 10 th /5 th	hich this course	eis		
4. Th un fus of 5. 42	Course general e course provides derstanding of the es, relays, circuit b protection systems Pre-requiremen 4EE-3 Power Syste	Description comprehensive of principles of the preakers, instrume for transmission line ts for this course m Analysis I	concepts of power sy operation of protect nt transformers and th nes, busbars, motors, se (if any):	vstem protection ion system conneir application generators, ar	on including an omponents, e.g. ns for the design nd transformers.
6.	Co- requiremen	its for this cour	se (if any): NA		

7. Course Main Objective(s)

After completing this course, the students should be able to:

- 1. To understand basic concepts in power system protection.
- 2. To conduct relay selection and setting calculations

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Explain the principles of operation of protective devices	1	LecturesTutorials	 Test 1 Homework Assignment Final exam
2.0	Skills			
2.1	Apply the fundamental principles of power system protective devices	6	LecturesTutorials	 Quizzes Test 1 Final exam
2.2	Analyze the performance of power system transducers	6	LecturesTutorials	 Quizzes Test 2 Final exam
2.3	Design of protection systems for transmission lines, busbars, transformers, generators and motors	2	Lectures Tutorials	 Test 2 Mini Project Quizzes Final exam -
2.4	Communicate effectively to perform the presentation.	3	Lectures Tutorials	 Mini Project Presentation
3.0	Values, autonomy, and respons	ibility		
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	Lectures Tutorials	- Mini project Report
	Perform as an effective team-player in executing related project with imposed design constraints.	5	Lectures Tutorials	Mini project

C. Course Content

No	List of Topics	Contact Hours
1	Symmetrical and Unsymmetrical fault calculations	6
2	Introduction to protective relaying and switchgear	6
3	Relay types and operating principles	6





4	Current and voltage transformers	6
5	Over-current protection of lines	6
6	Distance protection of lines	8
7	Pilot line protection	6
8	Rotating machine protection	6
9	Transformer protection	6
10	Busbar protection	4
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Power system relaying. Horowitz & Phadke. (2nd Ed.) J. Wiley, 1995.
Supportive References	Power system protection, P. Andersen, Wiley, 1999.
Electronic Materials	None
Other Learning Materials	- MATLAB Program.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title Power System Analysis II
Course Code: 432EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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2. Required Facilities and Equipment	5
F. Assessment of Course Qualit	6
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A. General information about the course:						
Co	ourse Identificati	on				
1.	Credit hours:	3 (3,0,1)				
2.	Course type					
a.	University	College 🗆	Dep	artment⊠	Track□	Others□
b.	Required	Elective				
3. off	Level/year at wl ered: 10 th /5 th	hich this course	e is			
4. Thi cor sys fau sta	Course general is course provides mputer techniques stem components a ilts, symmetrical c bility.	Description students with a w used to solve som and modeling, optin components, unsy	vorking ne of th nal dis rmmeti	g knowledge o lese problems. patch of genera rical faults, po	f power system Topics covere ation, symmetri wer flow, and	n problems and d include power cal three-phase power system
5 . 424	Pre-requiremen 4EE-3 Power Syste	ts for this coursem Analysis I	se (if	any):		
6.	Co- requiremen	ts for this cour	se (if	any): NA		
7.	Course Main Ob	jective(s)				

After completing this course, the students should be able to:

- 1. To understand basic concepts in power system operation.
- 2. To conduct power flow and short circuit studies.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
	Hybrid		
3.	Traditional classroomE-learning		
4.	Distance learning		
2. Contact Hours (based on the academic semester)			
2. Cor	tact Hours (based on the a	cademic semester)	
No	Activ	tity	Contact Hours
2. Cor No 1.	Activ	cademic semester) ity	Contact Hours 45
2. Cor No 1. 2.	Lectures Laboratory/Studio	ity	Contact Hours 45
2. Cor No 1. 2. 3.	Laboratory/Studio	ity	Contact Hours 45
2. Cor No 1. 2. 3. 4.	Activ Lectures Laboratory/Studio Field Tutorial	cademic semester) ity	Contact Hours 45 15
No 1. 2. 3. 4. 5.	Activ Lectures Laboratory/Studio Field Tutorial Others (specify)	ity	Contact Hours 45 15





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
1.0		with program	Strategies	Methods
1.0	Knowledge and understanding			
1.1	Recognize power system components and models.	1	LecturesTutorials	 Iest 1 Homework Assignment Quizzes Final exam
1.2	Solve basic economic dispatch problem.	1	LecturesTutorials	 Quizzes Test 2 Final exam
1.3			-	-
2.0	Skills			
2.1	Design power flow system.	2	LecturesTutorials	 Quizzes Test 1 Final exam
2.2	Estimate fault currents.	6	LecturesTutorials	QuizzesTest 2Final exam
2.3	Analyze the power system stability.	6	LecturesTutorials	 Homework Assignment Quizzes Final exam
2.4	Communicate effectively to perform the presentation.	3	LecturesTutorials	- Presentation
3.0	Values, autonomy, ar	nd responsibility		
3.1	Perform as an effective team player in executing related projects with imposed design constraints.	5	- Lectures - Tutorials	- Mini Project
3.2			-	-





C. Cou	rse Content	
No	List of Topics	Contact Hours
1	Introduction to interconnected power systems, components, and models.	6
2	Optimal dispatch of generation.	8
3	Formation of power system matrices.	6
4	Power flow analysis.	12
5	Symmetrical three-phase faults.	8
6	Symmetrical components	8
7	Unbalanced fault analysis.	6
8	Power system stability.	6
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/gro up projects and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Power System Analysis, John J. Grainger and William D. Stevenson, JrMcGraw-Hill, 1994.
Supportive References	Husain, "Electrical power Systems", CBS Publisher & Distributors, 1994.
Electronic Materials	None
Other Learning Materials	- MATLAB Program.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students





Items	Resources
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Code: 434EE-3

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. (A. General information about the course:				
Cοι	urse Identification	on			
1. (Credit hours:	3 (3,0,1)			
2. C	ourse type				
a.	University 🗆	College 🗆	Department⊠	Track□	Others□
b.	Required	Elective⊠			
3. I offe	Level/year at wh ered: 9 th /5 th	nich this course	e is		
Introduction to Integrated Circuit, Lambda Design Rules, NMOS and CMOS Inverters, NMOS and PMOS transistors, P -Well process, N -Well process, CMOS logic, CMOS Technologies, CMOS fabrication and Layout, Integrated Circuit Design using Verilog/VHDL. 5. Pre-requirements for this course (if any): 332EE-3 Electronics II 6. Co- requirements for this course (if any): NA					
 7. Course Main Objective(s) After completing this course, the students should be able to: Lambda Design Rules for NMOS and CMOS Inverters. NMOS and PMOS transistors, P -Well process, N -Well process. CMOS logic, CMOS Technologies. CMOS fabrication and Layout. Integrated Circuit Design using Verilog/VHDL. 					
1. T	eaching mod	e (mark all that	apply)		
Nc	Mode o	f Instruction	Contact Hou	urs	Percentage

-			
1.	Traditional classroom	60	100
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		
2. Cor	2. Contact Hours (based on the academic semester)		

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding		
1.1	Apply knowledge to understand the basic design rules.	1	Lectures Tutorials	 Mid Term1 & 2, Final Exams Quizzes
1.2				
2.0		Skills		
2.1	Design basic gates using the CMOS.	2	Lectures Tutorials	 Homework Assignment Quizzes Test 2 Final exam
2.2	Distinguish among different design technologies.	2	Lectures Tutorials	 Homework Assignment Quizzes Test 2 Final exam
2.3	Build basic logic circuits using VHDL.	6	Lectures Tutorials	 Homework Assignment Quizzes Test 2 Final exam
3.0	Values, autonomy, ar	nd responsibility		
3.1			-	
3.3			-	

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Integrated Circuits and Design Rules	8
2	NMOS and CMOS Inverters	12
3	NMOS and PMOS transistors	10
4	P -Well process, N -Well process	4
5	CMOS technologies	10
6	CMOS logic, CMOS fabrication and Layout	8
7	Integrated Circuit Design using Verilog/VHDL.	8
	Total	60





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
F			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	"Introduction To VLSI Circuits And Systems", By John P. Uyemura 1st Edition, 2010 Wiley Pub. Pucknell, "Basic VLSI Design", Prentice Hall Publication, 3rd Edition 1995.
Supportive References	"CMOS VLSI Design : A Circuits and Systems Perspective" By David Westen Neil H.E.Harris 3rd Edition, Addison-Wesley Pub.
Electronic Materials	 Notes of the concerned instructor on blackboard http://lib.nu.edu.sa/digitallibbrary.aspx www. en.wikipedia.org
Other Learning Materials	PsPice Software

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher





Assessment Areas/Issues	Assessor	Assessment Methods
		during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Microwave Engineering
Course Code: 441EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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1. References and Learning Resources	6	
2. Required Facilities and Equipment	6	
F. Assessment of Course Qualit		
G. Specification Approval Data		





A. General information about the course:					
Со	urse Identificatio	on			
1.	Credit hours:	3 (3,0,1)			
2.	Course type				
a.	University	College □	Department⊠	Track□	Others□
b.	Required	Elective⊠			
3. off	Level/year at wh ered: 9 th /5 th	ich this course	is		
4. Course general Description Theory, analysis and design of transmission lines, transmission line propagation, impedance matching techniques using Smith chart, waveguides, microwave network analysis using S-Parameters, analysis and design of passive and active components, measurement techniques and application of microwave systems.					
5. Pre-requirements for this course (if any): Electromagnetism II (344EE-3)					
6. Co- requirements for this course (if any): NA					
7.	7. Course Main Objective(s)				

After completing this course, the students should be able to:

- 1. Describe the impacts and applications of microwave circuits.
- 2. Analysis and design of transmission lines.
- 3. Explain transmission line propagation.
- 4. Analyze impedance matching techniques using the Smith chart.
- 5. Study and analyze waveguides.
- 6. Study and investigate microwave network analysis using S-Parameters.
- 7. Analysis and design of passive and active components.
- 8. Explain and perform the measurement techniques.
- 9. Describe the applications of microwave systems.

10. Utilize computer simulation tools in solving problems.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		





No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understandin	g		
1.1	Describe the basic principles, impacts, and applications of microwave circuits.	1	Lectures Tutorials	 Mid Term1 & 2, Final Exams Quizzes
1.2	Apply various microwave circuit analysis techniques in solving problems.	7	 Lectures Tutorials 3D EM simulator MATLAB 	
2.0	Skills			
2.1	Perform the microwave measurement techniques.	6	 Lectures Tutorials 3D EM simulator MATLAB 	 Homework Assignment Quizzes Test 2 Final exam
2.2	Design active and passive microwave components.	2	 Lectures Tutorials 3D EM simulator MATLAB 	 Group project Oral presentation Final exam
2.3	Utilize computer simulation tools in solving problems related to applications of microwave circuits.	6	 Lectures Tutorials 3D EM simulator MATLAB 	 Homework Assignment Quizzes Test 2 Final exam
2.4	Communicate effectively to perform the presentation.	3	 Lectures Tutorials 3D EM simulator MATLAB 	- Presentation





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.0	Values, autonomy, and respo	onsibility		
3.1	Perform as an effective team-player in executing related project with imposed design constraints.	5	 Lectures Tutorials 3D EM simulator MATLAB 	Mini project
3.2	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Lectures Tutorials	- Mini project Report
3.3				

C. Course Content

No	List of Topics	Contact Hours
1	Transmission lines	10
2	Smith Chart	6
3	Waveguides	10
4	Microwave Network Analysis	4
5	Matching Networks	4
6	Microwave Filter Design	8
7	Microwave Amplifier Design	8
8	Microwave Measurements	4
9	Application of Microwave Systems	6
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
5.			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)





E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Pozar, D. M. (2011). Microwave Engineering. 4th Edition. New York: John Wiley & Sons.
Supportive References	 Awang, Z. (2013). Microwave System Design. Last Edition. New York: Springer. Kizer, G. (2013). Digital Microwave Communication: Engineering Point-to-Point Microwave Systems. Last Edition. New Jersey: John Wiley & Sons. Collier, R. L. & Skinner, A. D. (2007). Microwave Measurements. 3rd Edition. Herts: Institution of Engineering and Technology.
Electronic Materials	None
Other Learning Materials	 3D EM simulator such as Computer Simulation Technology (CST). MATLAB Program.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for





Assessment Areas/Issues	Assessor	Assessment Methods		
		feedback on the syllabus.		
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software		
Other				
Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)				

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title Antenna and Wave Propagation
Course Code: 442EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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E. Learning Resources and Facilities		
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F. Assessment of Course Qualit		
G. Specification Approval Data		





٩.	. General information about the course:				
Со	ourse Identification	on			
1.	Credit hours:	3 (3,0,1)			
2.	Course type				
a.	University 🗆	College 🗆	Department⊠	Track□	Others□
b.	Required	Elective⊠			
3. off	Level/year at wh ered: 10 th /5 th	nich this course	is		
4. Course general Description Introduction to antennas, theory of wave propagation, fundamental parameters of antenna, radar range equation, half-wave dipole antenna, antenna arrays, planar antennas, broadband antennas, methods of antenna measurements, matching techniques, principle of designing different types of antenna and antenna arrays.					
5. Ele	5. Pre-requirements for this course (if any): Electromagnetism II (344EE-2)				
6.	Co- requirement	ts for this cours	se (if any): NA		

7. Course Main Objective(s)

After completing this course, the students should be able to:

- 1. Explain various types of antennas and applications.
- 2. Understand the fundamental parameters of the antenna.
- 3. Realize the radar range equation, a half-wave dipole antenna, antenna arrays, planar antennas, and broadband antennas.
- 4. Explain methods of antenna measurements.
- 5. Understand matching techniques.
- 6. Describe the principles of designing different types of antennae, and the design of antenna arrays.
- 7. Explain and understand the theory of wave propagation.
- 8. Construct an antenna system to satisfy the requirements of a wireless system.
- 9. Utilize computer simulation tools in solving problems.

1. Teaching mode (r	mark all that apply)
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No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		





No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Explain various types of problems and propagation theory in a telecommunication system.	1	LecturesTutorials	 Test 1 Homework Assignment Quizzes Final exam
1.2	Summarize the principle of sustainable design of antenna and wave propagation.	1	LecturesTutorials3D EM simulatorMATLAB	QuizzesTest 2Final exam
1.3			-	-
2.0	Skills			
2.1	Design an antenna system or component to satisfy the requirements of a wireless system.	2	 Lectures Tutorials 3D EM simulator MATLAB 	 Quizzes Test 1 Final exam Mini Project
2.2	Utilize computer simulation tools in solving antenna- related problems.	6	LecturesTutorials3D EM simulatorMATLAB	 Group project Oral presentation Final exam
2.3	Communicate effectively to perform the presentation.	3	LecturesTutorials	- Mini Project Presentation
3.0	Values, autonomy, ar	nd responsibility		
3.1	Recognize ethical and professional responsibilities in	4	Lectures Tutorials	 Mini project Report





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	engineering situations and make informed judgments			
3.2	Perform as an effective team-player in executing related project with imposed design constraints.	5	Lectures Tutorials	Mini project

C. Course Content

No	List of Topics	Contact Hours
1	Antenna Basic Concept	4
2	Antenna Parameters	8
3	Dipole Antenna	8
4	Antenna Types	8
5	Antenna Array	8
6	Antenna Measurement	8
7	Antenna in Systems	8
8	Wave Propagation	8
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/gro up projects and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
_			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References

Das, S.K., and Das, A. (2013). Antenna and Wave Propagation, Last Edition. New Delhi: Tata McGraw Hill Education Private Limited





Supportive References	 Carr, J. J., and Hippisley, G. W. (2011). Practical Antenna Handbook. 5th Edition, New York: McGraw-Hill. Pozar, D. M. (2011). Microwave Engineering. 4th Edition. New York: John Wiley & Sons. Granatstein, V. L. (2012). Physical Principle of Wireless Communications. 2nd Edition, Boca Raton: CRC Press.
Electronic Materials	None
Other Learning Materials	 MATLAB Program. 3D EM simulator.

2. Required Facilities and equipment

Items	Resources	
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students	
Technology equipment (projector, smart board, software)	 Laptops Data show MATLAB 3D EM simulator 	
Other equipment (depending on the nature of the specialty)	None	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)





Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Digital Communications

Course Code: 444EE-3

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G




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A.	A. General information about the course:				
Co	urse Identificati	on			
1.	Credit hours:	3 (3,0,1)			
2.	Course type				
a.	University 🗆	College 🗆	Department⊠	Track□	Others□
b.	Required 🛛	Elective□			
3. off 4. Thi cor pre- tec and	 3. Level/year at which this course is offered: 9th/5th 4. Course general Description This course provides student with basics and advanced techniques for digital communication, which are the basic elements of modern communication systems. It presents the basic elements to implement any communication system and different digital technique such as source coding, channel coding, digital modulation and detection, noise and wireless channel. Examples of modern Communication Systems. 				
5. Sy	5. Pre-requirements for this course (if any): Principles of Communication Systems (343EE-3)				
6.	6. Co- requirements for this course (if any): NA				
7. Aft	7. Course Main Objective(s) After completing this course the students should be able to:				

- 1. Categorize the basic elements of modern communication systems.
- 2. Classify of the advanced techniques for digital communication
- 3. Categorize digital modulations techniques .
- 4. Analyze digital modulation and demodulation systems.
- 5. Categorize wireless channel.
- 6. Analyze channel coding and error correction.
- 7. Explain modern communication systems

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	60	100
2.	E-learning	-	-
3.	HybridTraditional classroomE-learning	-	-
4.	Distance learning	-	-

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45





2.	Laboratory/Studio	-
3.	Field	-
4.	Tutorial	15
5.	Others (specify)	-
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
Coue	Outcomes	with program	Strategies	Methods
1.0	Knowledge and unde	rstanding		
1.1	Identify the main element of digital communication systems.	1	- Lectures - Tutorials	 Homework Assignment Quizzes Final exam
1.2	Apply knowledge of mathematics, science, and engineering to the analysis of digital modulation techniques	7	 Lectures Tutorials Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Test 1 Final exam
1.3				
1.4				
2.0	Skills			
2.1	Analyze the process of digital communications transmission and reception and the effect of noise on signal quality.	6	 Lectures Tutorials Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Test 2 Final exam
2.2	Analyze the baseband signal coding, bandpass coding and channel coding in digital communications.	6	 Lectures Tutorials Computer programing tools (MATLAB) 	 Homework Assignment Quizzes Test 2 Final exam
2.3	Design the basic digital communication systems.	2	 Lectures Tutorials Computer programing tools (MATLAB) 	 Mimi project Quizzes Test 2 Final exam





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.4	Communicateeffectivelytoperformthepresentation.	3	Class Lectures Tutorials	Presentation
3.0	Values, autonomy, ar	nd responsibility		
3.1	Perform as an effective team- player in executing related project with imposed design constraints.	5	Class Lectures Tutorials	Mini-project
3.2	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	Lectures Tutorials	 Mini project Report
3.3				
3.4				

C. Course Content

No	List of Topics	Contact Hours
1	Review of probability theory and random variables	4
2	Introduction digital communication system	4
3	Line and block code	4
4	Pulse Code Modulation (PCM) and Delta Modulation (DM)	4
5	Digital Modulation Techniques (ASK, FSK, PSK, GMSK and QAM)	
6	Error Detection and Correction	8
7	Information Theory and Source Coding.	4
8	Cryptography	4
9	Transmission impairment & the wireless channels characteristics	4
10	OFDM	4
11	11 Modern communication system	
	Total	60





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/grou project and presentation	Every chapter	5 %
4.	Mini Project and presentation	Week 13	5 %
5.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
6			

6.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities 1. References and Learning Resources

Essential References	Digital Communications Fundamentals and Applications, by Bernard Sklar, Second Edition, Hall P T R, United States, 2017.
Supportive References	 John G. Proakis and MasoudSalehi, (2008), Digital Communications, Fifth Edition, McGraw-Hill, United States. Behrouz A. Forouzan, (2007), Data Communications & Networking, Fourth Edition, McGraw-Hill, United States. Todd K. Moon, (2005), Error Correction Coding Mathematical Methods and Algorithms, A John Wiley & Sons, Inc, Canada. Andrew J.Viterbi & Jim K Omura, (1979), Principles of digital communication and coding, McGraw-Hill, United States. Upamanyu Madhow, (2008), Fundamentals of Digital Communication, Cambridge University, UK.
Electronic Materials	None
Other Learning Materials	Computer programing tools (MATLAB)

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	- Laptops - Data show MATLAB





Items	Resources
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
The effectiveness of teaching and assessment	Students	 A questionnaire is administered upon completing the course syllabus. Open discussion for the students during the semester to recognize their weak points in the course. Feedback from Test 1, Test 2 and Final exam records.
Evaluation of teaching	Peer reviewer	The peer reviewer will monitor a teaching session for assessment by filling the peer reviewer assessment form.
The extent of students' achievement of course learning outcomes	Teaching staff	CLOSO program.
Improvement of teaching	- Students Peer reviewer	 Learning from students feedback. Learning from peer reviewer and department feedback. Learning/Using various teaching methods (lectures, discussions, workshops, exams). Learning/Using various teaching mediums (projector, whiteboard, videos, educational visits).
Quality of learning resources	Students	A questionnaire is administered by the end of every semester.





Assessment Areas/Issues	Assessor	Assessment Methods
Verifying standards of student achievement	- Program leader Independent member teaching staff	Check student's marks by an independent teaching staff member /program leader a sample of student work and remark tests or a sample of assignments.

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course T	ïtle:	Communi	ications	Lab

Course Code: 445EE-1

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. General information about the course	Α.	General	information	about the	course:
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Course	Identification
000100	aontinoution

1. Credit hours: 1 (0,2,0)

2. Course type

- a. University □ College □ Department ⊠ Track □ Others □
- b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 9th/ 5th

4. Course general Description

Experiments on signal representation and filtering, amplitude modulation and demodulation, delta modulation (DM) and demodulation, frequency modulation and detection, sampling and quantization, pulse amplitude modulation (PAM), pulse code modulation (PCM) and demodulation, Time Division Multiplexing (TDM).

5. Pre-requirements for this course (if any): 444EE-3 Digital Communications

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Know the primary communication resources, namely, transmission power and bandwidth
- 2. Know the communication channel for signals transmission
- 3. Define the modulation process
- 4. Know the continuous modulation techniques, amplitude and angle modulation
- 5. Define sampling, which is basic to all forms of pulse modulation
- 6. Define quantization, which when combined with sampling represents analog signals in the form of amplitude and time

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100
2.	E-learning	-	-
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	-





2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
Couc	Outcomes	with program	Strategies	Methods
1.0	Knowledge and unde	rstanding	P	P.
1.1			-	-
1.2			-	-
1.3				
1.4				
2.0	Skills			
2.1	ApplyFouriertransformtodifferenttypesignalsincommunicationsystems.	6	- Lab Sessions using CASSY lab2	 Mid-term exams. Final Exam. Lab reports
2.2	Analyze and evaluate different analogue modulation and demodulation techniques like AM, FM and DM, in time and frequency domains using lab modules.	6	Lab Sessions using CASSY lab2.	 Mid-term exams. Final Exam. Lab reports
2.3	Apply sampling to achieve Pulse Amplitude Modulation (PAM) and Pulse Code Modulation (PCM) using lab modules.	6	Lab Sessions using CASSY lab2	- Mid- term exams - Final Exam. Lab reports
2.4	Recognize the Time Division Multiplexing (TDM) using lab modules.	6	Lab Sessions using CASSY lab2	- Mid- term exams





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				- Final Exam. Lab reports
2.5	Communicate effectively in group discussion and oral examination.	3	- Experiment	- Lab Perfor mance and oral examin ation
3.0	Values, autonomy, ar	nd responsibility		
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	- Experiment	- Reports
3.2	Work effectively as a member of the team.	5	- Experiment	Lab Performance and oral examination
3.3				
3.4				

C. Course Content

No	List of Topics	Contact Hours
1	Getting started with Communications Lab modules and devices.	2
2	Experiment #1: DSB-LC modulation and demodulation experiment on CASSY2 LAB	2
3	Experiment #2: DSB-SC modulation and demodulation experiment on CASSY2 LAB	2
4	Experiment #3: SSB modulation and demodulation experiment on CASSY2 LAB	2
5	Experiment #4: Pulse Amplitude Modulation (PAM) experiments on CASSY2 LAB	2
6	Experiment #5: FM modulation and demodulation experiment on CASSY2 LAB	2
7	MID Exam	2
8	Experiment #6: ASK and FSK modulation and demodulation on COM3LAB-Board 700 74	2
9	Experiment #7: 2PSK and 4PSK modulation and demodulation	2
10	Experiment #8: Differential Phase Coding (DPSK) modulation and demodulation on COM3LAB-Board 700 74	2
11	Experiment #9: Shift Keying Noise Susceptibility on COM3LAB-Board 700 74	2
12	Experiment #10: Error detection and error correction on COM3LAB-Board 700 74	2
13	Experiment #11: Influence of the Transmission Channel on COM3LAB-Board 700 74	2





14	Experiment #12: Modem Operating Modes on COM3LAB-Board 700 74	2
15	Final Exam	2
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid-Term exam	Week 8	20 %
2.	Lab Performance and Pre- quizzes	Every Week	10 %
3.	Experiment Reports	Week 14	20 %
4.	Final Exam	End of semester	50 %
-			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Communications Systems, Simon Haykin, John Wiley, 2010.
Supportive References	 Modern digital and analog communication systems, B. P. Lathi, Zhing, 2011. Fundamentals of telecommunications, 2nd Edition, Roger L. Freeman, 2005. Telecommunication and Data Communications Handbook, Ray Horak, 2008.
Electronic Materials	 AM Manual FM Manual PCM Manual The COM3LAB-Board 700 74 Manual
Other Learning Materials	 CASSY Lab 2 System Computer programing tools (MATLAB)

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Laboratory hall suitable for 15 students
Technology equipment (projector, smart board, software)	PCData showMATLAB
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching and assessment	Students	 Questionnaire is administered upon completing the course syllabus. Open discussion for the students during the semester to recognize their weak points in the course. Feedback from midterm and Final exam records.
Evaluation of teaching	Peer reviewer	The peer reviewer will monitor a teaching session for assessment by filling the peer reviewer assessment form.
Extent of students' achievement of course learning outcomes	Teaching staff	CLOSO program.
Improvement of teaching	- Students Peer reviewer	 Learning from students feedback. Learning from peer reviewer and department feedback. Learning/Using various teaching methods (lectures, discussions, workshops, exams). Learning/Using various teaching mediums (projector, whiteboard, videos, educational visits).
Quality of learning resources	Students	Questionnaire is administered by the end of every semester
Verifying standards of student achievement	 Program leader Independent member teaching staff 	Check student's marks by an independent teaching staff member /program leader a sample of student work and remark tests or a sample of assignments.

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)





Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Embedded Systems Design			
Course Code: 446EE-3			
Program: Bachelor of Science in Electrical Engineering			
Department: Electrical Engineering			
College: Engineering			
Institution: Najran University			
Version: 2			
Last Revision Date: 22/08/2023G			





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1. References and Learning Resources	5	
2. Required Facilities and Equipment	5	
F. Assessment of Course Qualit		
G. Specification Approval Data		





A. General information about the course:					
Course Identification					
1.	Credit hours:	3 (2,2,1)			
2.	Course type				
a.	University	College 🗆	Department⊠	Track□	Others□
b.	Required	Elective⊠			
3. Level/year at which this course is offered: 9 th /5 th					
4. Course general Description This course covers the main elements of embedded systems design. Emphasis given includes hardware and firmware design, hardware selection, hardware testing, development tools and software, firmware development and firmware debugging.					
5. Pre-requirements for this course (if any): Introduction to Microprocessor (354EE-3)					
6. Co- requirements for this course (if any): NA					
_					

7. Course Main Objective(s)

After completing this course, the students should be able to:

1. Analyze and design embedded systems.

1. Teaching mode (mark all that apply)

	U		
No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	15
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understandin	g		
1.1	Identify embedded systems and its component and characteristics.	1	LecturesTutorialsMATLAB	 Mid Term1 & 2, Final Exams Quizzes
1.2	Identify Arduino microcontroller	1	LecturesTutorialsMATLAB	
2.0	Skills			
2.1	Design embedded systems using Arduino	2	LecturesTutorialsMATLAB	 Lab Exam Assignment Mini Project Test 1 Final exam
2.2	Communicate effectively to perform the presentation.	3	LecturesTutorialsMATLAB	Presentatio n
3.0	Values, autonomy, and respo	onsibility		
3.1	Perform as an effective team-player in executing the related project with imposed design constraints.	5	LecturesTutorialsMATLAB	Mini project
3.2	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	LecturesTutorials	- Mini project Report
33				

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to embedded systems.	10
2	Microprocessors and microcontrollers	10
3	Memory.	8
4	Interfacing.	8
5	Introduction to Arduino.	8
6	Programming using Arduino.	8
7	Designing embedded systems using Arduino.	8





Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	15 %
2.	Test 2	Week 12	15 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	5 %
4.	LAB course work	Every Week	15 %
5.	LAB Final	Week 14	15 %
6.	Final Exam	At the end of the semester as determined by the academic calendar	35 %

7.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	 Embedded System Design: A unified Hardware/Software Introduction, Frank Vahid and Tony Givargis. Wiley. 2001 Designing Embedded Systems with Arduino, Tianhong Pan and Yi Zhu, Springer, 2018 	
Supportive References	 Ganguly, A.K. (2013). Embedded System: Design, Programming and Applications. Oxford: Alpha Science Intl Ltd. Iniewski, K. (2012). Embedded System: Hardware, Design and Implementation. New Jersey: John Wiley & Sons. Sanchez, J. & Canton, M.P. (2012). Embedded Systems Circuits and Programming. Boca Raton: CRC Press 	
Electronic Materials	None	
Other Learning Materials	- MATLAB Program.	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB





Items	Resources
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title: Data Communications and Networks
Course Code: 447EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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G. Specification Approval Data		





A. General information about the course:

Course Identification

1. Credit hours: 3 (2,2,1)

2. Course type

- a. University □ College □ Department⊠ Track□ Others□
- b. Required □ Elective⊠

3. Level/year at which this course is

offered: 10th/5th

4. Course general Description

Network Architectures. Network Layers: OSI Model and TCP/IP Model. Physical Layer Protocols and Digital Transmission Fundamentals. Data Link Layer Protocols. Network Layer Protocols: IP Protocols. Medium Access Control systems. Packet Switching and Circuit Switching. Routing in Packet Switching Network Architectures. Network Layers: OSI Model and TCP/IP Model. Physical Layer Protocols and Digital Transmission Fundamentals. Data Link Layer Protocols. Network Layer Protocols: IP Protocols. Medium Access Control Systems. Packet Switching and Circuit Switching. Routing in Packet Switching. Network security.

5. Pre-requirements for this course (if any):

Digital Communication (444EE-3)

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course, the students should be able to:

- 1. Build an understanding of the fundamental concepts of computer networking.
- 2. Introduce students to the evolution of computer networks and the concepts of data communication.
- 3. Introduce students to the general principles of network design and compare the different network topologies.
- 4. Introduce students to the wireless Local Area Networks.
- 5. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
- 6. Introduce the student to advanced networking concepts, preparing the student for entry into Advanced courses in computer networking.

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

1. Teaching mode (mark all that apply)





2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	75

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Codo	Course Learning	Code of CLOs aligned	Teaching	Assessment	
Coue	Outcomes	with program	Strategies	Methods	
1.0	Knowledge and understanding				
1.1	Identify problems regarding computer and network security, and their impact on society.	1	LecturesTutorialsMATLAB	 Homework Assignment Quizzes Final exam 	
1.2	Identify, formulate, and solve engineering problems related to telecommunications Networks.	1	LecturesTutorialsMATLAB	 Lab Exam Lab Report Quizzes Test 2 Final exam 	
2.0	Skills				
2.1	Design of telecommunication systems.	2	LecturesTutorialsMATLAB	 Lab Exam Lab Report Quizzes Test 1 Final exam 	
2.2	Use techniques, and skills of modern programming tools in the engineering practice of Telecommunication Networks.	6	LecturesTutorialsMATLAB	 Lab Exam Lab Report Quizzes Test 2 Final exam 	
3.0	Values, autonomy, ar	nd responsibility			
3.1					
3.2					





C. Course Content

No	List of Topics	Contact Hours
1	Communication Theory Review	4
2	TCP/IP Suite & ISO OSI Model	8
3	Logical (IP) Addressing	4
4	Internet Protocol	8
5	Network Layer Protocols	8
6	Routing	4
7	Wired LAN: Ethernet	4
8	Wi-Fi Networks	4
9	Connecting and Extending LANS	4
10	WANs	4
11	TELEPHONE NETWORK: Network Elements, Multiplexing, Switching, Signaling, Traffic Analysis, Cellular Networks	4
12	Network security	4
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	15 %
2.	Test 2	Week 12	15 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	5 %
4.	LAB course work	Every Week	15 %
5.	LAB Final	Week 15	15 %
6.	Final Exam	At the end of the semester as determined by the academic calendar	35 %

7.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Data Communications and Networking, B. A. Forouzan, S. C. Fegan, McGraw-Hill, 5th Edition,2013		
Supportive References	- Albert Leon-Garcia and IndraWidjaja, Communication Networks: FundamentalConcepts and Key Architectures, 2nd ed., McGraw-Hill, 2004.		





	 Peterson & Davie, "Computer Networks, A Systems Approach", 3rd ed, Harcourt, 2005 Andrew S. Tanenbaum, "Computer Networks", 4th ed., Prentice Hall, 2003. Bertsekas and Gallagher "Data Networks," PHI, 2000
Electronic Materials	None
Other Learning Materials	- MATLAB Program.

2. Required Facilities and equipment

Items	Resources	
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students	
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB	
Other equipment (depending on the nature of the specialty)	None	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)





G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title Wireless Communications
Course Code: 448EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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F. Assessment of Course Qualit	6
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۹.	A. General information about the course:					
Co	Course Islandification					
1.	Credit hours:	3 (3.0.1)				
2.	Course type					
a.	University	College 🗆	Department⊠	Track□	Others□	
b.	Required	Elective⊠				
3. off	3. Level/year at which this course is offered: 10 th /5 th					
4. Course general Description Introduction to wireless communications, Channel models, large- and small-scale fading, Diversity, cellular system analysis (frequency planning, capacity, sectorization, etc.), Link budget analysis, Multiple access techniques (TDMA, FDMA, CDMA), technology and applications of satellite communications. Standards of wireless communications.						
5. Pre-requirements for this course (if any): Digital Communications (444EE-3)						
6. Co- requirements for this course (if any): NA						
7. Aft	 7. Course Main Objective(s) After completing this course, the students should be able to: Explain the basic concepts of wireless communications. Describe channel models. 					

- 3. Understand large- and small-scale fading.
- 4. Explain and understand diversity.
- 5. Understand cellular system analysis (frequency planning, capacity, sectorization, etc.).
- 6. Recognize link budget analysis.
- 7. Explain multiple access techniques (TDMA, FDMA, CDMA).
- 8. Describe the technology and applications of satellite communications.
- 9. Understand the standards of wireless communications.
- 10. Evaluate problems related to mobile radio and satellite communication.
- 11. Explain the mobility management of mobile radio communication systems.

n reaching mode (mark an mat apply)						
No	Mode of Instruction	Contact Hours	Percentage			
1.	Traditional classroom	54	90			
2.	E-learning	06	10			
3.	HybridTraditional classroomE-learning					
4.	Distance learning					

1. Teaching mode (mark all that apply)





No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods		
1.0	Knowledge and understanding					
1.1	Explain the mobility management of mobile radio communication system.	1	LecturesTutorials	 Test 1 Homework Assignment Quizzes Final exam 		
1.2						
1.3						
2.0	Skills					
2.1	Evaluate problems related to mobile radio and satellite communication.	6	 Lectures Tutorials 3D EM simulator MATLAB 	 Quizzes Test 1 Test 2 Final exam 		
2.2	Develop a system using components and processes for the need of wireless communication systems design.	2	 Lectures Tutorials 3D EM simulator MATLAB 	 Group project Oral presentation Final exam 		
2.3	Communicate effectively to perform the presentation.	3	LecturesTutorials	 Mini Project Presentation 		
3.0	Values, autonomy, and responsibility					
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	Lectures Tutorials	- Mini project Report		
3.2	Perform as an effective team-player	5	Lectures	Mini project		




Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
	Outcomes	with program	Strategies	Methods
	in executing related project with imposed design constraints.		Tutorials	

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to wireless communication systems	4
2	Fundamental of Cellular System Design	8
3	Architecture and Access Network Planning	8
4	Multipath Fading and Dispersion	8
5	Introduction of Orbital Satellite System	8
6	Propagation and Link Budget	8
7	Satellite Services	8
8	Mobility management of wireless communication systems	8
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/gro up projects and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
-			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities 1. References and Learning Resources

Essential References	Theodore S. Rappaport (2001). Wireless Communications Principles and Practice. 2nd Edition, Prentice Hall.
Supportive References	 Kolawole, M. O. (2013). Satellite Communication Engineering. 2nd Edition, Boca Raton: CRC Press. Montenbruck, O. & Grill, E. (2011). Satellite Orbits: Model, Methods and Applications. Last Edition. New York: Springer.





	 Maral, G., Bousquet, M. & Sun, Z. (2010). Satellite Communications Systems: Systems, Techniques, and Technology. 5th Edition. New York: John Wiley & Sons.
Electronic Materials	None
Other Learning Materials	- MATLAB Program.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE Electrical Engineering Department Council





DATE 30/	/08/2023











T-104 2022

Course Specification

Course Title Digital Image Processing				
Course Code: 451EE-3				
Program: Bachelor of Science in Electrical Engineering				
Department: Electrical Engineering				
College: Engineering				
Institution: Najran University				
Version: 2				
Last Revision Date: 22/08/2023G				





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1. References and Learning Resources	6
2. Required Facilities and Equipment	6
F. Assessment of Course Qualit	6
G. Specification Approval Data	7





A. General information about the course:					
Course Identification					
1.	Credit hours:	3 (2,2,1)			
2.	Course type				
a.	University 🗆	College 🗆	Department⊠	Track□	Others□
b.	Required	Elective⊠			
3. Level/year at which this course is offered: 10 th /5 th					
 4. Course general Description Fundamentals; review of DSP algorithms such as DFT; intensity transforms, frequency domain filtering; image restoration and reconstruction; color image processing; multiresolution processing; image compression; morphological image processing. 5. Pre-requirements for this course (if any): 					
Signal and System Analysis (342EE-3) 6. Co- requirements for this course (if any): NA					
7. Aft	7. Course Main Objective(s) After completing this course, the students should be able to: 1. Study the fundamentals of digital image processing.				

- 2. Apply image transform.
- 3. Categorize and apply image enhancement techniques.
- 4. Analyze image restoration techniques and methods.
- 5. Classify and apply Image compression and Segmentation.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	75





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Identify the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.	1	LecturesTutorialsMATLAB	 Test 1 Homework Assignment Quizzes Final exam
1.2				
1.3	Skille			
2.0	SKIIIS			
2.1	Design spatial- domain and frequency-domain image filtering	2	LecturesTutorialsMATLAB	 Lab Exam Lab Report Quizzes Test 1 Final exam Mini Project
2.2	Apply frequency transformations, such as DFT and DCT for images	6	LecturesTutorialsMATLAB	 Lab Exam Lab Report Quizzes Test 2 Final exam
2.3	Design a filter to restore the noisy image.	2	LecturesTutorialsMATLAB	 Lab Exam Lab Report Quizzes Test 2 Final exam
2.4	Communicate effectively to perform the presentation.	3	LecturesTutorials	Mini ProjectPresentation
3.0	Values, autonomy, ar	nd responsibility		
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	Lectures - Tutorials	 Mini project Report
3.2	Perform as an effective team-player in executing related	5	- Tutorials	Mini project





Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
	Outcomes	with program	Strategies	Methods
	project with imposed design constraints.			

C. Course Content

No	List of Topics	Contact Hours
1	The digital image processing field: Introduction, definitions, and applications	4
2	Image fundamentals: Models, sampling, quantization, and basic operations	7
3	1-D and 2-D Discrete Fourier Transform and properties of DFT	10
4	Image Enhancement: Background, Point processing, Histogram equalization and specification	10
5	Intensity Transformations and spatial domain filtering: Smoothing, Median, & Sharpening. Frequency Domain Filtering: Low & high-pass	14
6	Frequency Domain Filtering: Low & high-pass	6
7	Image restoration and reconstruction	6
8	Image compression	6
9	Image segmentation	6
10	Object recognition	6
	Total	75

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	15 %
2.	Test 2	Week 12	15 %
3.	Assignments/Quizzes/gro up projects and presentation	Every chapter	5 %
4.	LAB course work	Every Week	15 %
5.	LAB Final	Week 15	15 %
6.	Final Exam	At the end of the semester as determined by the academic calendar	35 %
_			

7.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)





E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Digital Image Processing, R. Gonzalez and R. Woods, Pearson; 4 edition, 2017.
Supportive References	 Gonzalez, Rafael C., Eddins, Steven L., Woods, Richard E, Digital Image Processing Using MATLAB, 1st Ed., Pearson Prentice-Hall, 2004. Milan Sonka, Vaclav Hlavac, Roger Boyle, Image Processing, Analysis, and Machine Vision, Thomson Learning, 2008, ISBN 0-495-08252-X.
Electronic Materials	None
Other Learning Materials	- MATLAB Program.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software





Assessment Areas/Issues	Assessor	Assessment Methods
Other		
Assessor (Students, Faculty, Program L	Leaders, Peer Reviewer, Others	(specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title Digital Signal Processing
Course Code: 456EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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1. References and Learning Resources	5
2. Required Facilities and Equipment	6
F. Assessment of Course Qualit	6
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A. General information about the course:					
Course Identification					
1. Credit hours:	3 (3,0,1)				
2. Course type					
a. University 🗆	College □	Department⊠	Track□	Others□	
b. Required	Elective⊠				
3. Level/year at which this course is offered: 9 th /5 th					
4. Course general Description Review of discrete-time signals and systems; The Discrete-Time Fourier transform, Fast Fourier Transform, Z Transform, Recursive and no recursive digital filters design and realization; Decimation and interpolation; Applications of digital signal processing in communications.					
5. Pre-requirements for this course (if any):					
6. Co- requirements for this course (if any): NA					

7. Course Main Objective(s)

After completing this course, the students should be able to:

- 1. Understand and use different theories and tools for digital signal processing.
- 2. Design digital filters

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60





B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
1.0	Outcomes	with program	Strategies	Methods
1.1	Apply knowledge of sampling theorem to reconstruct signals.	1	LecturesTutorials	 Homework Assignment Quizzes Final exam
1.2	Define and execute different discrete transform techniques	7	LecturesTutorials	 Lab Report Quizzes Test 2 Final exam
1.3	Execute the theories and properties of discrete LTI systems	7	LecturesTutorials	 Assignment Quizzes Midterm exam Final exam
2.0	Skills			
2.1	Design different types of system responses.	2	LecturesTutorialsSimulation	- Quizzes - Test 2 - Final exam - Mini project
2.2	Design analog and digital filters.	2	LecturesTutorialsSimulation	- Quizzes - Test 2 - Final exam - Mini project
2.3	Communicate effectively to perform the presentation.	3	LecturesTutorials	- Presentation
3.0	Values, autonomy, ar	nd responsibility		
3.1	Perform as an effective team player in executing related projects with imposed design constraints.	5	Lectures Tutorials	Mini project
3.2	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	Lectures Tutorials	- Mini project Report
3.3				





No	List of Topics	Contact Hours	
1	Review of discrete-time signals and systems;	4	
2	Tabular method of convolution; correlation and its properties;	8	
3	The Discrete-Time Fourier transform: its definition, implementation of the transform technique in some basic and advanced sequences, Its application	8	
4	Fast Fourier Transform and Z Transform; Region of convergence (ROC), convolution using z-transform	12	
5	Analyze different discrete-time system response	8	
6	Recursive and non-recursive digital filters design and realization;	12	
7	Sampling theorem, applications of digital signal processing in communications;	8	
	Total	60	

C. Course Content

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	20 %
2.	Test 2	Week 12	20 %
3.	Assignments/Quizzes/group project and presentation	Every chapter	10 %
4.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
_			

5.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Mitra, "Digital Signal Processing: A Computer Based Approach", Mc Graw Hill, 4 th Edition 2010.
Supportive References	Vinay K. Ingle, John G. Proakis, "Digital Signal Processing using MATLAB" Cengage Learning, 4 th Edition, 2016
Electronic Materials	None
Other Learning Materials	- MATLAB Program.





2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title Applied Control
Course Code: 463EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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A. General information about the course:					
Co	urse Identificati	on			
1.	Credit hours:	3 (3,0,1)			
2.	Course type				
a.	University	College 🗆	Department⊠	Track□	Others□
b.	Required	Elective⊠			
3. off	Level/year at where the second	nich this course	is		
 4. Course general Description Basics of system modeling and analysis; PID controller design; Transducers and actuators; Real-time control; Control applications (power systems, robotics, etc.), Introduction of Programming Logic Controller (PLC).; Control design project. 5. Pre-requirements for this course (if any): 361EE-3 Automatic Control 6. Co-requirements for this course (if any): NA 					
o. oo requirements for this course (if any). NA					
 7. Course Main Objective(s) After completing this course, the students should be able to: Define and classify applied control strategies for industrial applications. 2. Analyses of different control method such as root locus, frequency domain 					

- Analyses of different control method such as root locus, frequency domain state space for different electrical and mechanical systems.
- 3. Analyses of different control method such as root locus, frequency domain, state space for different electrical and mechanical systems.
- 4. Model and Analyze different electrical and mechanical systems.
- 5. Compute the PID controller parameters via MATLAB Simulink and control toolbox
- 6. Introduction of Programming Logic Controller (PLC).

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45





2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	15
5.	Others (specify)	
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning	Code of CLOs aligned	Teaching	Assessment
1.0	Outcomes	with program Strategies Methods		
1.1	Introduction of Programming Logic Controller (PLC)	1	- Lectures - Tutorials	QuizzesTest 2Final exam
2.0	Skills			
2.1	Analyze different control methods such as root locus, frequency domain for different electrical and mechanical systems.	6	- Lectures - Tutorials	 Quizzes Test 1 Test 2 Final exam
2.2	Design of PID, and lead-lag controllers using various control methods.	2	LecturesTutorials	 Test 1 Test 2 Final exam Mini Project -
2.3	Communicate effectively to perform the presentation.	3	LecturesTutorials	 Mini Project Presentation
2.4			-	-
3.0	Values, autonomy, and responsibility			
3.1	Recognize ethical and professional responsibilities in engineering situations and make informed judgments	4	Lectures Tutorials	- Mini project Report
3.2	Compute the PID controller parameters via MATLAB Simulink and control toolbox	5	Computer programming tools (MATLAB)	Mini project





C. Course Content

No	List of Topics	Contact Hours
1	Introduction to control and its industrial applications.	8
2	Modeling and analysis of dynamic models of different systems such as mechanical and electrical systems including models of motor position and speed, and cruise control systems.	12
3	Analyze different control methods such as root locus, frequency domain, state-space for different electrical and mechanical systems.	12
4	Design of PID, and lead-lag control strategies.	12
5	Introduction of Programming Logic Controller (PLC).	12
6	MATLAB for control applications	4
	Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid 1	Week 6	15 %
2.	Mid 2	Week 12	15 %
3.	Mini project	Week 13	10 %
4.	Assignments/Quizzes/group project and presentation	Every chapter	10 %
5.	Final Exam	At the end of the semester as determined by the academic calendar	50 %
6.			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Modern control systems. Richard C. Dorf, Robert H. Bishop. 13 th ed. 2016.	
Supportive References	Katsuhiko Ogata, "Modern Control Engineering", Prentice Hall 2010.	
Electronic Materials	None	
Other Learning Materials	- MATLAB Program.	





2. Required Facilities and equipment

Items	Resources	
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students	
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB	
Other equipment (depending on the nature of the specialty)	None	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title Introduction to Robotics
Course Code: 464EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 3
Last Revision Date: 22/08/2023G





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A. General information about the course:					
Course Identification					
1.	Credit hours:	3 (2,2,0)			
2.	Course type				
a.	University 🗆	College □	Department⊠	Track□	Others□
b.	Required	Elective⊠			
3. Level/year at which this course is offered: 10 th /5 th					
4. Course general Description This course provides an overview of the robotics, basic elements of the robot, basics of the robot design, programming and vision in robotics and applications of robots in biomedical, deep water and manufacturing.					
 5. Pre-requirements for this course (if any): 361EE-3 Automatic Control 					
6. Co- requirements for this course (if any): NA					

7. Course Main Objective(s)

After completing this course, the students should be able to:

- 1. Identify the robotic elements and spatial description & transformations.
- 2. To learn the fundamentals and design of robots.
- 3. To be familiar with applications of robotics in the industry.
- 4. Design and simulate robots of various degrees of freedom.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	50 %
2.	E-learning		
3.	HybridTraditional classroomE-learning		
4.	Distance learning		
5.	Lab work	30	50 %

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	





Tota

60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding	tanding	
1.1	Identify the main element of robot design	1	- Lectures	 Mid Exam 1 Quiz Final exam
1.2	Identify the spatial description and transformations	1	- Lectures	 Mid Exam 1 Quiz Final exam
2.0	Skills			
2.1	Design kinematic and dynamic response of robotic systems	2	- Lectures	 Mid Exam 1 Mid Exam 2 Final exam Mini Project
2.3	Simulate robots of various degrees of freedom	6	 Lab demonstration & simulation 	- Lab Report - Quiz - Final Exam
2.4	Communicate effectively to perform the presentation.	3	- Lectures - Simulation	- Mini Project Presentatio n
3.0	Values, autonomy, ar	nd responsibility		
3.1	Perform as an effective team- player in executing related project with imposed design constraints.	5	- Lectures - Simulation	Mini Project

C. Course Content

No	List of Topics	Contact Hours
1	An overview of robots	02
2	Spatial description and transformations	06
3	Robot manipulator kinematics	06
4	Robot manipulator dynamics	06
5	Velocity and torque parameters	04
6	Manipulator-mechanism design	04
7	Modern trends and applications of robots	02







D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Random	10 %
2.	Midterm 1 Exam	Week 6	15 %
3.	Midterm 2 Exam	Week 12	15 %
4.	Lab Report	Week 13	5 %
5.	Mini Project	Week 13	5 %
6.	Final Exam (Practical)	At the end of the semester as determined by the academic calendar	20 %
7.	Final Exam (Theoretical)	At the end of the semester as determined by the academic calendar	30 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Introduction to Robotics, mechanics and control by John J. Graig, Pearson, 4 th Edition, 2017.
Supportive References	 Saha, S.K., Introduction to Robotics, 2nd Edition, 2014, Tata McGraw-Hill. Introduction to Robotics by P. J. McKerrow, Edition 2008, Wiley. Introduction to AI Robotics by R. R. Murphy, Edition 2000, MIT Press.
Electronic Materials	None
Other Learning Materials	Robot design and application videos from YouTube





2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	LaptopsData showMATLAB, Robo analyzer tool
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023





Field Experience Specifications

Course Title:	Field Training
Course Code:	490EE-0
Program:	Electrical Engineering
Department:	Electrical Engineering Department
College:	College of Engineering
Institution:	Najran University







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A. Field Experience Identification

1. Credit hours: 0 hours

2. Level/year at which this course is offered:

10th level / 5th year (After completing requirements of the study plan)

3. Dates and times allocation of field experience activities.

- Number of weeks: (8) weeks
- Number of days: (40) days
- Number of hours: (240) hours
- 4. Pre-requisites to join field experience (if any):

After completing requirements of the study plan

B. Learning Outcomes, and Training and Assessment Methods

1. Field Experience Learning Outcomes

	CLOs	Aligned PLOs
1	Knowledge and Understanding:	
1.1		
1.2		
2	Skills:	
2.1	Apply design concepts and skills learned from previous courses in the fieldwork to solve problems related to Electrical Engineering.	2
2.2	Analyze and interpret the machine drawings and its operations.	6
2.3		
2		
3	Values:	
3.1	Deliver and present the work field reports effectively through written and oral communication.	3
3.2	Communicate effectively within the working environment in a teamwork.	5
3.3	Follow safety regulations and professional responsibility in the fieldwork and office work to make proper judgements.	4

2. Alignment of Learning Outcomes with Training Activities and Assessment Methods

Code	Learning Outcomes	Training Methods/Activities	Assessment Methods
1.0	Knowledge and Understanding:		
1.1			
1.2			
2.0	Skills		
2.1	Apply design concepts and skills learned from previous courses in the fieldwork to solve problems related to Electrical Engineering.	 Independent learning Cooperative learning 	 Evaluation of field training reports Oral examination
2.2	Analyze and interpret the machine drawings and its operations.	DiscussionsCooperative learning	 Evaluation of field training reports Oral examination

Code	Learning Outcomes	Training Methods/Activities	Assessment Methods
3.0	Values		
3.1	Deliver and present the work field reports effectively through written and oral communication.	 Independent learning Cooperative learning 	Oral examination
3.2	Communicate effectively within the working environment in a teamwork.	 Independent learning Cooperative learning 	Oral examination
3.3	Follow safety regulations and professional responsibility in the fieldwork and office work to make proper judgements.	Independent learningCooperative learning	Oral examination

3. Field Experience Learning Outcomes Assessment a. Students Assessment Timetable

#	Assessment task*	Assessment timing (Week)	Percentage of Total Assessment Score
1	Final training report	8 th week	20%
2	Defense of training	8 th week	20%
3	Supervisor of training	Weekly	20%
4	Training Evolution (Form No. 4)	8 th week	20%
5	Logbook	Weekly	20%
	Total		100%

*Assessment task (i.e., Practical test, oral test, presentation, group project, essay, etc.)

b. Assessment Responsibilities

p	Category	Assessment Responsibility
1	Teaching Staff	 Evaluate the student's performance based on weekly reports and direct feedback from the field supervisor. Visit the trainee students in the field training at least once per period of training. Prepare the field experience report after completing the requirements of the field training. List recommendations for continuous improvement.
2	Field Supervisor	 Supervising the students during the field work. Follow and monitor the student's performance and progress. Evaluate the students and report to the teaching staff after completing the requirements of the field training.
3	Others (specify)	None.
C. Field Experience Administration

1. Field Experience Locations

a. Field Experience Locations Requirements

Suggested Field Experience Locations	General Requirements*	Special Requirements**
Saudi Electricity Company	- Arusilahilitar of	
Saudi Telecom Company (STC)	• Availability of	Must follow safety
Najran Municipality	A second ces.	standards,
Projects Management Companies at Najran	• Availability of	regulations, and
University	equipment.	instructions of
Any other private company in the field of	• Availability of	every field
electrical engineering	ladoratories (if any).	experience location.

*Ex: provides information technology ,equipment ,laboratories ,halls ,housing ,learning sources ,clinics etc.

**Ex: Criteria of the training institution or related to the specialization, such as: safety standards, dealing with patients in medical specialties, etc.

b. Decision-making procedures for identifying appropriate locations for field experience

The training field committee in the program will identify the appropriate locations for field experience based on the following points:

- 1) Feedback from the trainee students: The field trainee students can meet their academic supervisor during the official working hours or by email to submit the weekly report and to explain the work carried out in the company and difficulties if any.
- 2) Feedback from the teaching staff (academic supervisor): The academic supervisor should visit the trainee students in the field training at least one time per period of training to see its appropriateness for students' training.
- 3) Direct feedback from the field supervisor.
- 4) Questionnaires (trainee students, field supervisor).
- 5) Field experience report after completing the requirements of the field training.
- 6) The listed recommendations by trainee students, field supervisor, and academic supervisor.

2. Supervisory Staff

a. Selection of Supervisory Staff

Selection Items	Field Supervisor	Teaching Staff	
Qualifications	The field supervisor must have at least a bachelor's degree in the field of electrical engineering.	The faculty member must have at least a PhD degree.	
Selection Criteria	 Organization responsibility. However, the field supervisor must have adequate experience. Students' evaluation of the field experience location and field supervisor. Teaching staff's evaluation of the field experience location. 	 Evaluation of students. Program chair (HOD) based on teaching load. 	

b. Qualification and Training of Supervisory Staff

(Including the procedures and activities used to qualify and train the supervisory staff on supervising operations, implementing training activities, the follow-up and evaluation of students, etc.)

- The field training committee in the program organizes a meeting every academic semester for the teaching staff, explaining the purpose of the training field and the relevant rules and regulations to be adhered by the students, university, and the training organization.
- The teaching staff meet field supervisors at least once during the training period to discuss any observations regarding the program to avoid them in the future.
- Implementing training activities, follow-up, and evaluation of students.

3. Responsibilities

a. Field Experience Flowchart for Responsibility

including units, departments, and committees responsible for field experience, as evidenced by the relations between them.



Activity	Department or College	Teaching Staff	Student	Training Organization	Field Supervisor
Selection of a field experience site	\checkmark	\checkmark	\checkmark		
Selection of supervisory staff	\checkmark	\checkmark			
Provision of the required equipment				\checkmark	\checkmark
Provision of learning resources	\checkmark	\checkmark		\checkmark	\checkmark
Ensuring the safety of the site				\checkmark	\checkmark
Commuting to and from the field experience site	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Provision of support and guidance		\checkmark		\checkmark	\checkmark
Implementation of training activities (duties, reports, projects, presentations)		\checkmark		\checkmark	\checkmark
Follow up on student training activities		\checkmark		\checkmark	\checkmark
Adjusting attendance and leave				\checkmark	\checkmark
Assessment of learning outcomes	1	\checkmark		$\overline{\mathbf{v}}$	\checkmark
Evaluating the quality of field experience					

b. Distribution of Responsibilities for Field Experience Activities

4. Field Experience Implementation

a. Supervision and Follow-up Mechanism

- The supervision and follow-up are shared responsibilities among the head of the department, teaching staff, and the field supervisor.
- The trainee student should refer to the updated field training handbook provided by the department.
- At the end of the field training period, the student should fill in the form of the field training survey to discover the strengths and the weak points during the training.
- The surveys and field training committees in the program analyses all the questionnaires and submits a complete report to the department with suggested recommendations.
- Proper actions based on the suggested recommendations should be considered to overcome the challenges that the department faces regarding the field training course.

b. Student Support and Guidance Activities

- The field trainee students can meet their academic supervisor during the official working hours to submit the weekly report and to explain the work carried out in the company and difficulties if any.
- Trainees can also communicate with academic supervisor outside the official working hours by email.
- The academic supervisor should visit the trainee students in the field training at least one time per period of training.

Potential Risks Safety Actions		Risk Management Procedures
The expulsion of	Official agreement should be	Work in accordance with the
training without formalized between the college conditions as given in the		conditions as given in the
compelling reasons.	and the field training location.	agreement.
Possibility of injury	Official agreement should be	Work in accordance with the
the trainee during	formalized between the college	conditions as given in the
the field training.	and the field training location.	agreement.

5. Safety and Risk Management

G. Training Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods		
Effectiveness of training and assessment	 Students Company's supervisors 	 A questionnaire is administered upon completing the course. Open discussion for the students during the semester to recognize their weak points in the course 		
Extent of students' achievement of course learning outcomes	Academic supervisor	CLOSO program		
Improvement of field training	StudentsCompany's supervisors	 Learning from students' feedback Learning from company's supervisors' feedback 		
Quality of learning resources	Students	Questionnaire is administered by the end of every semester		
Verifying standards of student achievement	 Program leader Academic supervisor 	Check student's marks by the program leader of a sample of student work.		

Evaluation areas (e.g., Effectiveness of Training and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Supervisory Staff, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

E. Specification Approval Data

Council / Committee Electrical Engineering Department Council	
Reference No.	14450214-0486-00002
Date	30/08/2023









T-104 2022

Course Specification

Course Title:	Graduation Project I
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Course Code: 491EE-2

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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A. General information about the course:

Course Identification		
1. Credit hours:	2 (1,2,0)	

2. Course type

a. University □ College □ Department ⊠ Track □ Others □

b. Required ⊠ Elective□

3. Level/year at which this course is

offered: 9th/5th

4. Course general Description

The graduation project is a culminating handy course work for which the students are expected to integrate and apply what they have learned through previous academic work and field experiences, with faculty supervision. These projects may be "new," continuation of work done in previous courses; or may be projects started in a previous course that become significantly expanded and enhanced for the thesis. It has two phases- to be taken in consecutive two semesters at senior level.

At the beginning of the semester, the students propose a topic on which they are supposed to work as a group. Project students meet in class weekly, discuss their research, and screen their progresses for peer and faculty critique and suggestions. At the end of the semester, students present their thesis projects to the supervising committee.

5. Pre-requirements for this course (if any): 353EE-3; 361EE-3

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course, the students should be able to:

- 1. Ability to formulate design project and manage it.
- 2. Ability to review related data and knowledge from credible sources.
- 3. Ability to communicate orally and to report technically.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	15	50%
2.	E-learning	15	50%
3.	HybridTraditional classroomE-learning		
4.	Distance learning		





No	Activity	Contact Hours
1.	Lectures	
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	30

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods	
1.0	Knowledge and understanding				
1.1	Review the available literature in the project domain.	7	 Discussion rounds, homework, assignments 	Discussion,presentation	
1.2	Identify and formulate engineering problems in the area of electrical engineering	1	 discussion rounds, homework, assignments 	Discussion,presentation	
1.3					
1.4					
2.0	Skills				
2.1	Design a system, component or process with defined constraints.	2	 Lectures Discussion rounds Tutorials 	 Presentatio n Final Report Draft 	
2.2	Solve engineering problems and implement designed solution	2	 Lectures Discussion rounds Tutorials 	 Log book Presentatio n Final Report Draft 	
2.3	Communicate effectively in written engineering report and in oral presentation	3	discussion rounds, homework, tutorials, assignments	Discussion, presentation	
2.4					
3.0	Values, autonomy, ar	nd responsibility			





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.1	Work effectively as a member of the team	5	discussion rounds, homework, assignments	Discussion, presentation
3.2	Plan a project effectively using project-planning techniques to ensure proper timing, budgeting and professional ethics.	4	discussion rounds, homework, assignments	Discussion, presentation
3.3				
3.4				

C. Course Content

No	List of Topics	Contact Hours
1	Choose a project and write a proposal.	2
2	Initial Student Presentations: project title, description, motivation and aims.	4
3	Project planning, process, management activities, work breakdown, time estimation, milestones, activity sequencing, activity network, scheduling, Gantt charts and re-planning.	6
4	Literature survey: search and review, tracing the information, critical evaluation, writing literature review, ethics and responsibilities.	4
5	Software development, life cycle, models, assistance in writing the progress report	4
6	Student presentations: project proposal: problem definition, objectives, justification, and approach.	
7	Final presentation & final report (committee)	6
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Logbook (supervisor)	Every week	10 %
2.	Final Report Draft (supervisor)	Week 13	30 %
3.	Mid Term Presentation	Week 14	20%





No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
4.	Presentation (examination panel)	Week 14	15 %
5.	Final Report Draft (examination panel)	Week 14	25 %
6			

6.

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

i Nererenees and Learning Nesedices		
Essential References	Any available books in the library related to project work.	
Supportive References	The students review the literature of the project from Published research articles.	
Electronic Materials	Youtube channel for project concepts	
Other Learning Materials	The work is done by the students on the software related to the project (like MATLAB, Pspice, Lab view, ARDUINO)	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	The department provides the classroom and Lab facilities needed by the students.
Technology equipment (projector, smart board, software)	MATLAB, Pspice, Lab view, ARDUINO
Other equipment (depending on the nature of the specialty)	NA

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Lecture contents, organization	Peer Reviewer	The peer reviewer monitors a teaching session and evaluate the course instructor using peer evaluation form.
Lecturer interaction with students, use of learning resources, verbal communication	Peer Reviewer	The peer reviewer monitors a teaching session and evaluate the course instructor





Assessment Areas/Issues	Assessor	Assessment Methods
		using peer evaluation form.
Verification of students achievements	Independent faculty member	Review and verify the marking and grades of the students.
Improvement in teaching	Student surveys, Peer Evaluation	Teaching strategies could be improved based on the students feedback and peer evaluation.
Effectiveness of teaching and assessment	Students survey	Students evaluate the course instructor through survey and through edugate.
Extent of achievement of course learning outcomes	Quality coordinator	CLOSO program.
Quality of learning resources	Students survey	Questionnaire is administered in every semester

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023











T-104 2022

Course Specification

Course Title:	Graduation	Project II
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Course Code: 492EE-3

Program: Bachelor of Science in Electrical Engineering

Department: Electrical Engineering

College: Engineering

Institution: Najran University

Version: 2

Last Revision Date: 22/08/2023G





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G. Specification Approval Data		





A. General information about the course:

Course	Identification

- 1. Credit hours: 3 (2,2,0)
- 2. Course type
- a. University □ College □ Department ⊠ Track □ Others □
- b. Required ⊠ Elective□
- 3. Level/year at which this course is offered: 10th /5th

4. Course general Description

The graduation project is a culminating handy course work for which the students are expected to integrate and apply what they have learned through previous academic work and field experiences, with faculty supervision. This is the continuation of graduation project-I, and consequently graduation project-II is supposed to be taken in the consecutive semester.

Throughout the semester, the students try to implement what they proposed in graduation project-I as a group. Project students meet in class or lab weekly, segregate the work into sub-projects, and integrate the individual works to reach their target and faculty critique and suggestions. At the conclusion of the semester, students present their design projects along with the thesis to the supervising committee.

5. Pre-requirements for this course (if any):

491EE-2: Graduation Project I

407GE-2 Management of Engineering Projects

6. Co- requirements for this course (if any): NA

7. Course Main Objective(s)

After completing this course the students should be able to:

- 1. Identify and formulate engineering problems in the area of electrical engineering.
- 2. Work effectively as a member of the team
- 3. Conduct enough literature review in the project domain.
- 4. Design a system, component, or process with defined constraints.
- 5. Solve engineering problems and implement designed solution.
- 6. Collect and analyze data, and draw conclusions though experiments while testing a project.
- 7. Communicate orally and in writing the project design details in a technical report

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90





No	Mode of Instruction	Contact Hours	Percentage
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Conduct enough literature review in the project domain.	7	 Lectures Discussion rounds 	 Presentatio n Final Report Draft
1.2	Identify and formulate engineering problems in the area of electrical engineering	1	LecturesDiscussion rounds	 Log book Presentatio n Final Report Draft
1.3				
1.4				
2.0	Skills			
2.1	Design a system, component or process with defined constraints.	2	 Lectures Discussion rounds 	 Presentatio n Final Report Draft
2.2	Collect and analyze data, and draw conclusions though	6	 Lectures Discussion rounds 	- Presentatio n Final Report Draft





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	experiments while testing a project		 Computer programing tools Lab 	
2.3	Solve engineering problems and implement designed solution	2	 Lectures Discussion rounds 	 Log book Presentatio n Final Report Draft
2.4	Communicate orally and in writing the project design details in a technical report.	3	Discussion rounds	- Log book Presentation
3.0	Values, autonomy, ar	nd responsibility		
3.1	Work effectively as a member of the team.	5	 Lectures Discussion rounds 	Log book
3.2	Recognize ethical and professional responsibilities in engineering situations and make informed judgments.	4	Discussion rounds	- Log book Presentation
3.3				
0.4				

C. Course Content

No	List of Topics	Contact Hours
1	Prepare a road-map, collect the necessary equipment/software for the project that was proposed, planned and studied in graduation project I.	12
2	Planning and implementation, peer review, critical comments and suggestions from the supervisor.	8
3	Design and investigation of complex problems using proper techniques, tools and resources	16
4	Testing, data analysis, validation and critical thinking	12
5	Results and discussion including societal/health/safety impact	
6	Comparison, conclusion, recommendation and assessment on implication to society/environment	8
7	Submit the report along with the project work to the committee	4
8		





Total	60

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Logbook	Every week	15 %
2.	Presentation and Poster (Assessment Panel)	Week 16	20 %
3.	Final Report Draft (Supervisor)	Week 16	35 %
4.	Final Report Draft (Assessment Panel)	Week 16	30 %
5			

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

.			
Essential References	Any available books in the library related to project work.		
Supportive References	The students review the literature of the project from Published research articles.		
Electronic Materials	Youtube channels for project concepts		
Other Learning Materials	The work is done by the students on the software related to the project (like MATLAB, Pspice, LabVIEW, Arduino)		

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	The department provides the classroom and Lab facilities needed by the students (maximum 3 students for each group).
Technology equipment (projector, smart board, software)	MATLAB, Pspice, LabVIEW, ARDUINO
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching and assessment	Students	 Questionnaire is administered upon





Assessment Areas/Issues	Assessor	Assessment Methods
		 completing the course syllabus Open discussion for the students during the semester to recognize their weakness points in the course Feedback from Test 1, Test 2 and Final exam records
Evaluation of teaching	Peer reviewer	The peer reviewer will monitor a teaching session for assessment by filling the peer reviewer assessment form
Extent of students' achievement of course learning outcomes	Teaching staff	CLOSO program
Improvement of teaching	- Students Peer reviewer	 Learning form students feedback Learning from peer reviewer and department feedback Learning/Using various teaching methods (lecturing, discussions, workshops, exams) Learning/Using various teaching medias (projector, whiteboard, videos, educational visits)
Quality of learning resources	Students	Questionnaire is administered by end of every semester
Verifying standards of student achievement	- Program leader Independent member teaching staff	Check student's marks by an independent member teaching staff/program leader of a sample of student work and remarking of tests or a sample of assignments.

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)





G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
DATE	30/08/2023









T-104 2022

Course Specification

Course Title: Renewable Energy System
Course Code: 418EE-3
Program: Bachelor of Science in Electrical Engineering
Department: Electrical Engineering
College: Engineering
Institution: Najran University
Version: 2
Last Revision Date: 22/08/2023G





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Α.	A. General information about the course:				
Со	urse Identificati	on			
1.	Credit hours:	3 (2,2,1)			
2.	Course type				
a.	University	College □	Department⊠	Track□	Others□
b.	Required	Elective⊠			
3. off	Level/year at where the second	nich this course	is		
 4. Course general Description Introduction, Energy and Civilization, Distributed Generation Technologies & Economics, Fundamentals of Solar Power Systems, Concentrated Solar Power, Fundamentals of Wind Power Systems, Energy Storage, Integration of Distributed Generation into the Grid, Impact of Distributed Generation on Power System Operation, Applications. 5. Pre-requirements for this course (if any): 					
Ро 6.	Co- requiremen	sis I: 424EE-3 ts for this cours	e (if any): NA		
7. Aft	Course Main Ob	jective(s) course the studer	nts should be able to:		

- 1. Recognize how the renewable energy resources can help the economy and environment
- 2. Categorize types of renewable energy resources.
- 3. Describe the principles of the most common renewable energy systems
- 4. Recognize and analyze of Solar Power Systems
- 5. Recognize and analyze of Wind Power Systems
- 6. Design of renewable energy systems
- 7. Making use of the equipment and techniques in the Renewable Energy Laboratory to translate the theory into reality.

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	54	90
2.	E-learning	06	10
3.	HybridTraditional classroomE-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	40





5.	Total	60
5	Others (specify)	
4.	Tutorial	
3.	Field	
2.	Laboratory/Studio	20

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and unde	rstanding	Charlegieo	
1.1	Recognize the need of renewable energy technologies and their role.	1	- Lectures	AssignmentQuizzesFinal exam
1.2	Classify the different types of Renewable Energy Sources	1	- Lectures	 Assignment Quizzes Test 1 Final exam
1.3				
1.4				
2.0		Skills		
2.1	Design Renewable Energy Systems.	2	- Lectures	 Quizzes Test 2 Final exam
2.2	Analyze and perform experiment related to Renewable Energy Systems meeting residential and industrial needs.	6	- Lectures - Lab	 Lab reports Quizzes Test 2 Final exam
2.3	Communicate effectively to perform the presentation.	3	- Lectures - Lab	Mini projectOral exam
2.4		1 11 114		
3.0	Values, autonomy, ar	id responsibility		
3.1	Perform as an effective team-player in executing related projects with imposed design constraints.	5	- Lectures - Lab	 Mini project Oral exam in Lab





C. Course Content

No	List of Topics theory	Contact Hours
1	Energy and Civilization	5
2	Distribution Generation Technologies & Economics	5
3	Fundamentals of Solar Power Systems	3
4	Concentrated Solar Power	3
5	Fundamentals of Wind Power Systems	3
6	Energy Storage	3
7	Integration of Distribution Generation into the Grid	5
8	Impact of Distribution Generation on Power System Operation	8
9	Applications	5
	Total	40

No	List of Experiment LAB	Contact Hours
1	Experiment 1: Determining the no-load characteristics of the generator: To understand the relationship between the generator's output voltage and rotation speed.	2
2	Experiment 2: Operation of a real, small wind power plant	2
3	Experiment 3: Operation of the Inverters under various loads: To examine operation in the storage mode at various loads and wind speeds.	2
4	Experiment 4: Operation with different loads: To examine operation in the storage mode at various loads and wind speeds.	2
5	Experiment 5: Converting light into electricity: In this experiment, we will demonstrate how a solar cell converts sunlight or electric light into a different form of energy.	2
6	Experiment 6: Solar radiation's angle of incidence: In this experiment, we will examine a solar cell's response to the radiated light's angle of incidence.	2
7	Experiment 7: Shading : In this experiment, we will examine the effect of shading on a solar module connected in series to three further modules.	2
8	Experiment 8 : Loads in direct operating mode: In this experiment, we will examine the response of a PV module connected to a variety of loads (consumers) in the direct operating mode.	2
	Total	16





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Test 1	Week 6	15 %
2.	Test 2	Week 12	15 %
3.	Assignments/Quizzes/group project and presentation /	Every chapter	5 %
4.	Lab assessment	Every Experiment	15 %
5.	Final Exam	At the end of the semester as determined by the academic calendar	40 %
6.	Final Exam – Lab assessment	At the end of the semester	10 %

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities **1. References and Learning Resources**

Essential References	Design of Smart Power Grid Renewable Energy Systems, Ali Keyhani , John Wiley 2011, ISBN 978-0470-62761-7
Supportive References	 The Integration of Distributed Generation in the Power System, Math Bollen. Fainan Hassan, John Wiley 2011, ISBN 978-0470-64337-2 Renewable Energy Technologies, edited by J.C.Sabonnadiere, Wiley, 2009,ISBN 978-1-84821-135-3 Sustainable Energy Systems and Applications, Springer, 2011, 978-0-387-95860-6
Electronic Materials	http://lib.nu.edu.sa/digitallibbrary.aspx
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room for a maximum of 20 students
Technology equipment (projector, smart board, software)	None
Other equipment (depending on the nature of the specialty)	None





F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Peer reviewer	The peer reviewer will monitor the teaching method of the teacher during class and assess him by filling out the peer reviewer assessment form.
Effectiveness of Students assessment	Students	Students evaluate the course instructor through survey form and through edugate.
Quality of learning resources	Students	 A questionnaire is given to the students for feedback on the syllabus.
The extent to which CLOs have been achieved	Teaching staff	CLOSO Software
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify) Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Electrical Engineering Department Council
REFERENCE NO.	14450214-0486-00002
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