Fourth level courses (Senior-1) - First semester (Fall)

No.	Cod	Course Name	Instructor
1	CECE 317	Electric Machine I	Ass. Prof. Dr. Shady Abdel Aleem
2	CECE 431	Digital Control	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
3	CECE 319	Power Electronics I	Dr. Mostafa Hassan Mostafa Abdel-Gawad
4	CECE 309	Electrical Energy Conversions	Ass. Prof. Dr. Shady Abdel Aleem
5	BASE 306	Research Methods	Dr. Amera Marei
6	BASE 404	Negotiation Skills	Dr. Amera Marei

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course specification

Course code:	Course name
CECE 317	Electric Machine I

A- Affiliation

Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Electrical and communication engineering
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B- Basic Information

Course Name	Electric Machine I
Code	CECE 317
Course Level	Fourth level courses (Senior-1) - First semester (Fall)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Lab	2hr
Total	6hr
Prerequisite	CECE 203
Instructor name/Email	Ass. Prof. Dr. Shady Abdel Aleem Shady.Sebai@sva.edu.eg

C- Professional information

1- Course core

D.C. machines : Theory and design: The generation of e.m.f., Work, Power, Force torque, The magnetic circuit of the dc machine, Armature windings, Armature reaction, Inductance, Energy in magnetic field, Commutation, Methods of excitation, Load characteristics of dc generators and motors, Efficiency, Testing of dc machines, Special dc machines, Construction of dc machines, Mechanical details, Design, Main dimensions, The armature, Design of poles and inter-poles, Design of commutator, Calculation of efficiency, Examples on the design of dc motors and generators

2- Course learning objectives:

oc 1	Recognize the DC machines, Theory, design and types, DC Generators and DC Motor machines, Types of DC Generators and DC Motor machines, Starting a DC Motor.
oc 2	Analyze different types of DC generators their characteristics, industrial applications, effect of armature reaction and its assessment.
oc 3	Make the intrept the various losses in DC machines and there.

oc 4	explain the principle of DC motor, electrical characteristics and industrial application, purpose of starter and its design.
oc 5	analyze the purpose of parallel operation of DC generator.
oc6	able to understand features and their industrial applications.

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

4- The relation between the course objectives and the program objectives

	Course objectives	program objectives	
oc 1	Recognize the DC machines, Theory, design and types, DC Generators and DC Motor machines, Types of DC Generators and DC Motor machines, Starting a DC Motor.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 2	Analyze different types of DC generators their characteristics, industrial applications, effect of armature reaction and its assessment.	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
oc 3	Make the intrept the various losses in DC machines and there.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 4	explain the principle of DC motor, electrical characteristics and industrial application, purpose of starter and its design.	OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
oc 5	analyze the purpose of parallel operation of DC generator.	OP 5	Prepare students for engineering analyses and problem-solving using

			appropriate mathematical and computational methodologies.
oc6	able to understand features and their industrial applications.	OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

CS(1.1)	Recognize the construction of D.C machine, different windings.
CS(1.2)	Recognize the features and their industrial applications.
CS(1.3)	explain the principle of DC motor, electrical characteristics and industrial application, purpose of starter and its design.
CS(1.4)	Make the intrept the various losses in DC machines and their efficiency.
CS(1.5)	Express the different types of DC generators their characteristics, industrial applications, effect of armature reaction and its assessment.
CS(1.6)	Express the purpose of parallel operation of DC generator.

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

CS1	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.

7- The relation between the course learning outcomes and the program competencies

Course (LOs)		program competencies	
CS(1.1)	Recognize the construction of D.C machine, different windings.	CS1	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS(1.2)	Recognize the features and their industrial applications.	CS1	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS(1.3)	explain the principle of DC motor, electrical characteristics and	CS1	Design, develop and make analysis through simulations for heavy equipment (generators, motors,

	industrial application, purpose of starter and its design.		transmission lines, and distributing systems to interpret experimental results.
CS(1.4)	Make the intrept the various losses in DC machines and their efficiency.	CS1	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS(1.5)	Express the different types of DC generators their characteristics, industrial applications, effect of armature reaction and its assessment.	CS1	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS(1.6)	Express the purpose of parallel operation of DC generator.	CS1	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.

8- Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Introduction	2	2	2	CS(1.1)
2	DC Machinery Fundamentals	2	2	2	CS(1.1)
3	DC Generators (principle of operation)	2	2	2	CS(1.1)
4	DC shunt generator	2	2	2	CS(1.2)
5	DC series generator	2	2	2	CS(1.2)
6	DC compound generator	2	2	2	CS(1.3)
7	DC compound generator	2	2	2	CS(1.3)
8	Midterm		1.0		
9	DC Motors	2	2	2	CS(1.4)
10	DC motors (Types)	2	2	2	CS(1.4)

11	Solving problem in DC motors (Types)	2	2	2	CS(1.5)
12	Starting a DC Motor	2	2	2	CS(1.5)
13	End of DC Machines General	2	2	2	CS(1.6)
14	Revision	2	2	2	CS(1.6)
15	Revision	2	2	2	CS(1.6)
16	Final Exam		2.0		
Total hours		28	28	28	--

9- The Teaching and learning methods and their relation to the Los of the course

Teaching and Learning Methods

Course learning Outcomes (LOs)	On line / face to face	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	discovering	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
CS(1.1)		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CS(1.2)		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CS(1.3)		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CS(1.4)		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CS(1.5)		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
CS(1.6)		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓

Notes:

The research concerns the cooperative work, the discussion and the presentations.
The Tutorials concerns the brain storming and the problem solving.
Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

10- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment											
	quizzes	Mid -term exam	Final exam	sheets/ sketches	Projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling	
CS(1.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CS(1.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

CS(1.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.5)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		Weekly
Sheets and Sketches		Weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		Weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system

quizes	Quiz (1)	(5) marks		
	Quiz (2)	(5) marks		
Discussions	15%			
Sheets and Sketches	20%			
Researches and reports	20%	5 marks		(40) marks
the Projects	30%			
Practical modelling	20%			
Attendance		(10) marks		
Mid-term exam		(15) marks		
final exam			(60) marks	
Total			(100) marks	

10- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	P.C.SEN," Principles of electrical machines and power electronics, second edition, John Wiley& Sons
c) Recommend books	Mentioned at time.
d) Periodicals, Web sites, etc	No periodicals are needed.

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Course coordinator: Ass. Prof. Dr. Shady Abdel Aleem

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023

Course specification

Course code:	Course name
CECE 431	Digital Control

A- Affiliation

Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Electrical and communication engineering
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B- Basic Information

Course Name	Digital Control
Code	CECE 431
Course Level	Fourth level courses (Senior-1) - First semester (Fall)
Credit Hours	3Cr. Hr
Lectures	2hr
Tutorial	2hr
Total	4hr
Prerequisite	CECE 305
Instructor name/Email	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul ihab.nabil@sva.edu.eg

C- Professional information

1- Course core

D.C. machines : Theory and design: The generation of e.m.f., Work, Power, Force torque, The magnetic circuit of the dc machine, Armature windings, Armature reaction, Inductance, Energy in magnetic field, Commutation, Methods of excitation, Load characteristics of dc generators and motors, Efficiency, Testing of dc machines, Special dc machines, Construction of dc machines, Mechanical details, Design, Main dimensions, The armature, Design of poles and inter-poles, Design of commutator, Calculation of efficiency, Examples on the design of dc motors and generators

2- Course learning objectives:

oc 1	Recognize the practice in control systems design and analysis, almost all of which involves digital implementation.
oc 2	Recognize the sampling and quantization, z-transform, and other analysis tools used to analyze and design digital control systems.
oc 3	Recognize the state space and input/output representation, modelling and analysis of digital control systems.

oc 4	Recognize the modern control design methodologies for continuous-time and discrete-time systems that may include but are not limited to: state feedback control, state observer design, observer-based compensator design, LQ optimal control, Kalman filtering, LQG design, internal model-based design, Linear Matrix Inequality based designs, nonlinear observers, feedback linearization, model predictive control; understanding the issues regarding digital controller implementation.

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

4- The relation between the course objectives and the program objectives

	Course objectives	program objectives	
oc 1	Recognize the practice in control systems design and analysis, almost all of which involves digital implementation. Recognize the sampling and quantization, z-transform, and other analysis tools used to analyze and design digital control systems.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
		OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.
oc 2	Recognize the state space and input/output representation, modelling and analysis of digital control systems.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 3	Recognize the practice in control systems design and analysis, almost all of which involves digital implementation.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
		OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of

			electrical components, circuits, and systems.
			Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 4	Recognize the modern control design methodologies for continuous-time and discrete-time systems that may include but are not limited to: state feedback control, state observer design, observer-based compensator design, LQ optimal control, Kalman filtering, LQG design, internal model-based design, Linear Matrix Inequality based designs, nonlinear observers, feedback linearization, model predictive control; understanding the issues regarding digital controller implementation.	OP 5	
		OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

CS(1.1)	Explain the conversion from a continuous-time system into a discrete-time system (frequency and time domain techniques) and compute the z-transform of elementary signals and difference equations.
CS(1.2)	identify the poles of a second-order system based on the system's transient response (both continuous time and discrete time systems) and determine the stability of a closed-loop system (both continuous time and discrete time systems).
CS(1.3)	produce the root locus associated with a system's transfer function (both G[s] and G[z]) and Translate design specifications into allowable dominant pole locations in both the s-plane and the z-plane.
CS(1.4)	Apply knowledge for Designing the controllers using root locus techniques (both continuous time and discrete time) and incorporate time delay introduced by a zero-order hold and know how to accommodate this delay during a digital controller design.

CS(1.5)	Produce the discrete equivalents of analog transfer functions and apply full-state feedback to achieve acceptable closed-loop behaviour for discrete-time systems.
CS(1.6)	Apply knowledge for designing an estimator and use it to control a discrete-time system and design a digital PID controller based on an existing analog PID controller.
CS(1.7)	Apply knowledge for Transforming between difference equations, block diagrams, and transfer functions associated with discrete systems and compute closed-form expressions for output waveforms from discrete-time systems with inputs.
CS(1.8)	Apply knowledge for degerming the steady-state error in continuous time and discrete time systems and transform discrete-time systems between transfer function and state-space representations and state observer design, observer-based compensator design, LQ optimal control, Kalman filtering, LQG design, internal model-based design, Linear Matrix Inequality based designs, nonlinear observers, feedback linearization, model predictive control; understanding the issues regarding digital controller implementation.

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.

7- The relation between the course learning outcomes and the program competencies

	Course (LOs)	program competencies
CS(1.1)	Explain the conversion from a continuous-time system into a discrete-time system (frequency and time domain techniques) and compute the z-transform of elementary signals and difference equations.	CS1 Design and analyze the construction of systems to generate
CS(1.2)	identify the poles of a second-order system based on the system's transient response (both continuous time and discrete time systems) and determine the stability of a closed-loop system (both continuous time and discrete time systems).	CS1 Design and analyze the construction of systems to generate
CS(1.3)	produce the root locus associated with a system's transfer function (both G[s] and G[z]) and Translate design specifications into allowable dominant pole locations in both the s-plane and the z-plane.	CS1 Design and analyze the construction of systems to generate

CS(1.4)	Apply knowledge for Designing the controllers using root locus techniques (both continuous time and discrete time) and incorporate time delay introduced by a zero-order hold and know how to accommodate this delay during a digital controller design.	CS1	Design and analyze the construction of systems to generate
CS(1.5)	Produce the discrete equivalents of analog transfer functions and apply full-state feedback to achieve acceptable closed-loop behaviour for discrete-time systems.	CS1	Design and analyze the construction of systems to generate
CS(1.6)	Apply knowledge for designing an estimator and use it to control a discrete-time system and design a digital PID controller based on an existing analog PID controller.	CS1	Design and analyze the construction of systems to generate
CS(1.7)	Apply knowledge for Transforming between difference equations, block diagrams, and transfer functions associated with discrete systems and compute closed-form expressions for output waveforms from discrete-time systems with inputs.	CS1	Design and analyze the construction of systems to generate
CS(1.8)	Apply knowledge for determing the steady-state error in continuous time and discrete time systems and transform discrete-time systems between transfer function and state-space representations and state observer design, observer-based compensator design, LQ optimal control, Kalman filtering, LQG design, internal model-based design, Linear Matrix Inequality based designs, nonlinear observers, feedback linearization, model predictive control; understanding the issues regarding digital controller implementation.	CS1	Design and analyze the construction of systems to generate

8- Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Introduction: Issues relating to digital control; Design process.	2	2	0	CS(1.1)
2	Focuses on sample Theory: Sampling Theory; Aliasing; Zero-Order Hold (ZOH); z-Transform and Difference Equations.	2	2	0	CS(1.1)
3	Focuses on difference Equation. Representation of Sample Data Systems: Pulse Transfer Function Representation; State Space Representation+ Quiz (1).	2	2	0	CS(1.1)
4	Quiz (1) +Focuses on analysis of Sampled Data Systems: Stability; Sensitivity and Robustness; Controllability/ Observability.	2	2	0	CS(1.2)
5	Focuses on Pole/Zero Cancellation. Design of Discrete-Time Controller, Input/Output Approach: Emulating Continuous-Time Controller.	2	2	0	CS(1.3)
6	Focuses on Invariant Methods; Direct Design. Design of Discrete-Time Controller.	2	2	0	CS(1.3)
7	Polynomial Approach: Problem Formulation.				CS(1.3)
8	Midterm		1.0		
9	Focuses on Pole Placement Design; Model Matching Problem. Design of Discrete-Time Controller.	2	2	0	CS(1.4)
10	State Space Approach: State Feedback.	2	2	0	CS(1.4)
11	Focuses on State Estimation (Observer).	2	2	0	CS(1.5)
12	Quiz (2) +Observer Based Compensator.	2	2	0	CS(1.5)
13	Focuses on LQ Optimal Control. LQG Control+	2	2	0	CS(1.6)
14	Focuses on Special Topics: LMI formulations of control, feedback linearization, nonlinear observers.	2	2	0	CS(1.7)
15	Focuses on model predictive control will be shown toward the end of the course.	2	2	0	CS(1.8)
16	Final Exam		2.0		
Total hours		28	28	0	--

9- The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	Teaching and Learning Methods												
	On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	Discovering / self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
CS(1.1)	✓												
CS(1.2)	✓	✓											
CS(1.3)	✓	✓	✓	✓	✓		✓		✓	✓			✓
CS(1.4)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
CS(1.5)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
CS(1.6)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
CS(1.7)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
CS(1.8)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓

Notes:

The research concerns the cooperative work, the discussion and the presentations.

The Tutorials concerns the brain storming and the problem solving.

Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

10- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment										
	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
CS(1.1)											
CS(1.2)											✓
CS(1.3)	✓	✓	✓	✓	✓		✓		✓		✓
CS(1.4)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.5)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.6)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.7)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.8)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1) Quiz (2)	Week (3) Week (10)
Discussions		Every week for any student
Presentations and Movies		weekly
Sheets and Sketches		weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system

quizes	Quiz (1) Quiz (2)	(5) marks (5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	5 marks	(40) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(10) marks	
Mid-term exam		(15) marks	
final exam			(60) marks
Total			(100) marks

10- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	M.SAM FADALI," Digital Control Engineering Analysis and Design".3rd edition.
c) Recommend books	Mentioned at time.
d) Periodicals, Web sites, etc	No periodicals are needed.

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Course coordinator:	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul	
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul	
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem	
Date:	2022/2023	

Course specification

Course code:	Course name
CECE 319	Power Electronics I
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Electrical and communication engineering
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B-Basic Information

Course Name	Power Electronics I
Code	CECE 319
Course Level	Fourth level courses (Senior-1) - First semester (Fall)
Credit Hours	3Cr. Hr
Lectures	2hr
Tutorial	2hr
Lab	2hr
Total	6hr
Prerequisite	CECE 302
Instructor name/Email	Dr. Mostafa Hassan Mostafa Abdel-Gawad drmostafa.hassan@sva.edu.eg

C- Professional information

1- Course core

Introduction to power electronics, Power diodes, Thyristors: Construction, Characteristics -application in rectifier circuits (converters), Firing circuits, Power transistors as switches, Phase shift controls, Phase controlled rectifiers static switches

2- Course learning objectives:

oc 1	Recognize the power electronics, Power diodes, Thyristors.
oc 2	Recognize the Characteristics -application in rectifier circuits (converters).
oc 3	Recognize the circuits, Power transistors as switches, Phase shift controls.
oc 4	Recognize the Phase controlled rectifiers-static switches.

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

4- The relation between the course objectives and the program objectives

	Course objectives	program objectives	
oc 1	Recognize the power electronics, Power diodes, Thyristors.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 2	Recognize the Characteristics - application in rectifier circuits (converters).	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
oc 3	Recognize the circuits, Power transistors as switches, Phase shift controls.	OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
oc 4	Recognize the Phase controlled rectifiers-static switches.	OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

CS(1.1)	Identify students with the power electronics, Power diodes, Thyristors.
CS(1.2)	Recognize the Characteristics -application in rectifier circuits (converters).
CS(1.3,3.1)	Prepare students for design the circuits, Power transistors as switches, Phase shift controls.
CS(1.4,3.2)	Obtain the characteristics-application in rectifier circuits (converters).
CS(1.5,3.1)	Apply knowledge for Firing the Phase controlled rectifiers-static switches

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.

7- The relation between the course learning outcomes and the program competencies

Course (LOs)		program competencies	
CS(1.1)	Identify students with the power electronics, Power diodes, Thyristors.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS(1.2)	Recognize the Characteristics - application in rectifier circuits (converters).	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS(1.3,3.1)	Prepare students for design the circuits, Power transistors as switches, Phase shift controls.	CS1	Design and analyze the construction of systems to generate
		CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation,

			transmission, control, and distribution systems.
CS(1.4,3.2)	Obtain the characteristics-application in rectifier circuits (converters).	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
		CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.
CS(1.5,3.1)	Apply knowledge for Firing the Phase controlled rectifiers-static switches	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
		CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.

8- Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Introduction: Power electronics component.	2	2	2	CS(1.1, 1.2)
2	Focuses on half wave (uncontrolled) controlled rectifier with resistative (R) load.	2	2	2	CS(1.2)
3	Focuses on half wave (uncontrolled) controlled rectifier with resistative- inductance (RL) load.	2	2	2	CS(1.2)
4	Quiz (1) + Focuses on half wave (uncontrolled) controlled rectifier with resistative- inductance (RL) load with free whealing diode.	2	2	2	CS(1.1)

5	Focuses on full wave (uncontrolled) controlled rectifier with resistative (R) load.	2	2	2	CS(1.1)
6	Focuses on full wave (uncontrolled) controlled rectifier with resistative- inductance (RL) load.	2	2	2	CS(1.3, 3.1)
7	Focuses on full wave (uncontrolled) controlled rectifier with resistative- inductance (RL) load with free whealing diode.	2	2	2	CS(1.3, 3.1)
8	Midterm		1.0		
9	Focuses on full wave (uncontrolled) controlled rectifier with resistative (R) load.	2	2	2	CS(1.4, 3.2)
10	Focuses on full wave (uncontrolled) controlled rectifier with resistative- inductance (RL) load.	2	2	2	CS(1.4, 3.2)
11	Focuses on full wave (uncontrolled) controlled rectifier with resistative- inductance (RL) load with free whealing diode.	2	2	2	CS(1.5, 3.1)
12	Focuses on full wave (controlled) controlled rectifier with resistative- inductance (RL) load	2	2	2	CS(1.5, 3.1)
13	Review on full wave (controlled) controlled rectifier with resistative- inductance (RL) load	2	2	2	CS(1.5, 3.1)
14	Focus on full wave (controlled) controlled rectifier with resistative- inductance (RL) load with free whealing diode.	2	2	2	CS(1.5, 3.1)
15	Reviews on full wave (controlled) controlled rectifier with resistative- inductance (RL) load with free whealing diode.	2	2	2	CS(1.5, 3.1)
16	Final Exam		2.0		
Total hours		20	20	20	--

9- The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	Teaching and Learning Methods												
	On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	Discovering / Self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
CS(1.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.2)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.3,3.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.4,3.2)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.5,3.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Notes:

The research concerns the cooperative work, the discussion and the presentations.

The Tutorials concerns the brain storming and the problem solving.

Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

10- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment										
	quizzes	Mid -term exam	Final exam	sheets/ sketches	Projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
CS(1.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.3,3.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.4,3.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.5,3.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		weekly
Sheets and Sketches		weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system

quizes	Quiz (1)	(5) marks	
	Quiz (2)	(5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	5 marks	(40) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(10) marks	
Mid-term exam		(15) marks	
final exam			(60) marks
Total			(100) marks

10- List of references:

a) Course notes — Lecture notes and handouts

b) Required books	▪ Adel S. Sedra, Kenneth C. Smith, "Microelectronic Circuits", 8th Edition, Oxford University Press. ▪ Behazad Rzavi, "Fundamentals of Microelectronics", 3nd edition, John Wiley. ▪ Thomas L. Floyd, "Electronic Devices", Prentice Hall, 9th edition. ▪ Donald Neamen, "Microelectronics: Circuit Analysis & Design", 4th edition, Mcgraw Hill, 2009.
c) Recommend books	Mentioned at time.
d) Periodicals, Web sites, etc	No periodicals are needed.

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Course coordinator:	Dr. Mostafa Hassan Mostafa Abdel-Gawad
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course specification

Course code:	Course name
CECE 309	Electrical Energy Conversions
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Electrical and communication engineering
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B-Basic Information

Course Name	Electrical Energy Conversions
Code	CECE 309
Course Level	Fourth level courses (Senior-1) - First semester (Fall)
Credit Hours	3Cr. Hr
Lectures	2hr
Tutorial	2hr
Total	4hr
Prerequisite	Electric Circuits II
Instructor name/Email	Ass. Prof. Dr. Shady Abdel Aleem Shady.Sebai@sva.edu.eg

C- Professional information

1- Course core

Covers magnetic circuits, single phase transformer and equivalent circuit, three phase transformers, basic concepts of electromechanical energy conversion, DC and AC machine

2- Course learning objectives:

oc 1	Recognize the magnetic circuit and its components.
oc 2	Recognize the Converting magnetic circuits.
oc 3	Recognize the basic concepts of electromechanical energy conversion, DC and AC.
oc 4	Recognize the single-phase transformer and equivalent circuit, three-phase transformers, and basic concepts of electromagnetic circuit, DC and AC machines.

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

4- The relation between the course objectives and the program objectives

Course objectives		program objectives	
oc 1	Recognize the magnetic circuit and its components.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 2	Recognize the Converting magnetic circuits.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 3	Recognize the basic concepts of electromechanical energy conversion, DC and AC.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
		OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
oc 4	Recognize the magnetic circuit and its components.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
		OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
		OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

CS(4.1)	Recognize the magnetic circuit and its components.
CS(4.2)	Recognize the basic concepts of electromagnetic energy conversion.
CS(4.3)	Apply knowledge to Convert the magnetic circuits in simplest form.

CS(4.4,6.1)	Apply knowledge to Design single phase transformer and equivalent circuit, three-phase transformers, and basic concepts of electromagnetic circuit, DC and AC machines.
CS(4.5,6.2)	Apply knowledge to Obtain the parameters of single-phase transformer and equivalent circuit, three-phase transformers, and basic concepts of electromagnetic circuit, DC and AC machines.

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

CS4	Test and examine components and equipment to prepare and review simple sketches, specifications, and data sheets for electric power components of generation, transmission, control, and distribution systems.
CS6	Review supplier documentation for compliance with specifications for electric power components of generation, transmission, control, and distribution systems.

7- The relation between the course learning outcomes and the program competencies

Course (LOs)		program competencies	
CS(4.1)	Recognize the magnetic circuit and its components.	CS4	Test and examine components and equipment to prepare and review simple sketches, specifications, and data sheets for electric power components of generation, transmission, control, and distribution systems.
CS(4.2)	Recognize the basic concepts of electromagnetic energy conversion.	CS4	Test and examine components and equipment to prepare and review simple sketches, specifications, and data sheets for electric power components of generation, transmission, control, and distribution systems.
CS(4.3)	Apply knowledge to Convert the magnetic circuits in simplest form.	CS4	Test and examine components and equipment to prepare and review simple sketches, specifications, and data sheets for electric power components of generation, transmission, control, and distribution systems.

CS(4.4,6.1)	Apply knowledge to Design single phase transformer and equivalent circuit, three-phase transformers, and basic concepts of electromagnetic circuit, DC and AC machines.	CP4	Test and examine components and equipment to prepare and review simple sketches, specifications, and data sheets for electric power components of generation, transmission, control, and distribution systems.
		CS6	Review supplier documentation for compliance with specifications for electric power components of generation, transmission, control, and distribution systems.
CS(4.5,6.2)	Apply knowledge to Obtain the parameters of single-phase transformer and equivalent circuit, three-phase transformers, and basic concepts of electromagnetic circuit, DC and AC machines.	CS4	Test and examine components and equipment to prepare and review simple sketches, specifications, and data sheets for electric power components of generation, transmission, control, and distribution systems.
		CS6	Review supplier documentation for compliance with specifications for electric power components of generation, transmission, control, and distribution systems.

8- Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Introduction: Magnetic Fields	2	2	0	CS(4.1)
2	Magnetic field quantities	2	2	0	CS(4.1)
3	Focuses on Analogy between electric and magnetic circuits +Firing effect+ Solved examples+ Quiz (1).	2	2	0	CS(4.1)
4	Quiz (1) +Focuses on Eddy currents losses+ Inductance (self & matual).	2	2	0	CS(4.2)
5	Focuses on Inductance in case of two coupled coils + solved examples.	2	2	0	CS(4.3)
6	Focuses on Introduction in transformers and general types of transformers + Voltage relation (transformer at no load).	2	2	0	CS(4.3)

7	Practical Transformers and its equivalent circuits.				CS(4.3)
8	Midterm		1.0		
9	Focuses on Practical Transformers and its equivalent circuits and solved examples in voltage regulation.	2	2	0	CS(4.2)
10	Equivalent circuits of Practical Transformers and solved examples in voltage regulation.	2	2	0	CS(4.3)
11	Focuses on transformer tests.	2	2	0	CS(4.5,6.2)
12	Quiz (2) + solved examples in transformer tests.	2	2	0	CS(4.4,6.1)
13	Focuses on solved examples on practical transformer and voltage regulation	2	2	0	CS(4.5,6.2)
14	Focuses on Special Topics: transformer tests.	2	2	0	CS(4.5,6.2)
15	Focuses on solved examples in transformers.				CS(4.3)
16	Final Exam		2.0		
Total hours		28	28	0	--

9- The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	Teaching and Learning Methods												
	On line / face to face lectures	Tutorials: sheets/ sketches	Projects	Problem solving	Brain storming	Practical: lab	Discovering self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
CS(4.1)	✓												
CS(4.2)	✓	✓											
CS(4.3)	✓	✓	✓	✓	✓		✓		✓	✓			✓
CS(4.4,6.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
CS(4.5,6.2)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓

Notes:

The research concerns the cooperative work, the discussion and the presentations.
The Tutorials concerns the brain storming and the problem solving.
Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

10- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment

	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
CS(4.1)	✓	✓	✓	✓	✓						
CS(4.2)	✓	✓	✓	✓	✓						✓
CS(4.3)	✓	✓	✓	✓	✓		✓		✓		✓
CS(4.4,6.1)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(4.5,6.2)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		Weekly
Sheets and Sketches		Weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		Weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system

Quizzes	Quiz (1)	(5) marks	
	Quiz (2)	(5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	5 marks	(40) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(10) marks	
Mid-term exam		(15) marks	
final exam			(60) marks
Total			(100) marks

10- List of references:

a) Course notes — Lecture notes and handouts

b) Required books
- R. Bailie Energy Conversion Engineering Addison, Wesley Publishing.
- G. W. Sutton. Direct Energy Conversion, McGraw-Hill.
- K.C. W eston,Energy Conversion, W est Publishing Company.

c) Recommend books — Mentioned at time.

d) Periodicals, Web sites, etc — No periodicals are needed.

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Course coordinator:	Ass. Prof. Dr. Shady Abdel Aleem
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course specification

Course code:	Course name
BASE306	Research Methods
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Basic Science
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B-Basic Information

Course Name	Research Methods
Code	BASE306
Course Level	Fourth level courses (Senior-1) - First semester (Fall)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Total	4hr
Prerequisite	-
Instructor name/Email	Dr. Amera Marei amira.morai@sva.edu.eg

C- Professional information

1- Course core

Develops the skills to produce effective persuasive writing with a focus on organization, content, analysis of readings, critical thinking. Provides training in the use and integration of sources, library and online research.

2- Course learning objectives:

oc 1	Recognize the science and its characteristics and science goals Methods of obtaining knowledge scientific research steps
oc 2	Recognize the Problem concept, Problem selection and identification, Research hypotheses and their formulation, Search Plan
oc 3	Recognize the ways to get knowledge
oc 4	Produce the research hypotheses and their applications
oc 5	Produce and prepare the research tool
oc 6	recognize the notes- questionnaire- the interview-the exams

oc 7	Utilize the study for different characteristics of research tools
oc 8	Recognize the experimental method -Anthropological method - Historical method and comparative research

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 1	Know how to apply Science and Scientific Research
OP 2	Be able to discover the fundamentals of scientific research
OP 3	Know ways to gain knowledge
OP 4	Solve and know the research hypotheses and their formulation
OP 5	Know how to use scientific research tools
OP 6	Be able to configure the research tools
OP7	Use and explain the characteristics of the research tools
OP8	Use and apply the research Methods

4- The relation between the course objectives and the program objectives

	Course objectives	**program objectives**	
oc 1	Recognize the science and its characteristics and science goals Methods of obtaining knowledge scientific research steps	OP 1	Know how to apply Science and Scientific Research
oc 2	Recognize the Problem concept, Problem selection and identification, Research hypotheses and their formulation, Search Plan	OP 2	Be able to discover the fundamentals of scientific research
oc 3	Recognize the ways to get knowledge	OP 3	Know ways to gain knowledge
oc 4	Produce the research hypotheses and their applications	OP 4	Solve and know the research hypotheses and their formulation
oc 5	Produce and prepare the research tool	OP 5	Know how to use scientific research tools

oc 6	recognize the notes- questionnaire- the interview-the exams	OP 6	Be able to configure the research tools
oc 7	Utilize the study for different characteristics of research tools	OP7	Use and explain the characteristics of the research tools
oc 8	Recognize the experimental method - Anthropological method - Historical method and comparative research	OP8	Use and apply the research Methods

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

C(5.1)	Apply a knowledge to produce effective persuasive writing with a focus on organization, content, analysis of readings, and critical thinking. Provides training in the use and integration of sources, library, and online research
C(5.2)	Apply a knowledge of Scientific Research, Problem Meaning, how to choose a problem, a research plane
C(5.3)	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles
C(7.1,8.1)	express his opinion by oral presentation and flexible model recalling the final configuration of masses.
C(5.4,8.2,7.1)	Communicate effectively with appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C(5.٥,8.3,7.2)	express his opinion by oral presentation and flexible model recalling the final configuration of masses.

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

C5	Practice research techniques and methods of investigation as an inherent part of learning.
C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams
C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

6-The relation between the course learning outcomes and the program competencies

	Course (LOs)		program competencies
C(5.1)	Apply a knowledge to produce effective persuasive writing with a focus on organization, content, analysis of readings, and critical thinking. Provides training in the use and integration of sources, library, and online research	C5	Practice research techniques and methods of investigation as an inherent part of learning.
C(5.2)	Apply a knowledge of Scientific Research, Problem Meaning, how to choose a problem, a research plane	C5	Practice research techniques and methods of investigation as an inherent part of learning.
C(5.3)	Utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles	C5	Practice research techniques and methods of investigation as an inherent part of learning.
		C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams
C(7.1,8.1)	express his opinion by oral presentation and flexible model recalling the final configuration of masses.	C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
C(5.4,8.2,7.1)	Communicate effectively with appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	C5	Practice research techniques and methods of investigation as an inherent part of learning.
		C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams

C(5.5,8.3,7.2)	express his opinion by oral presentation and flexible model recalling the final configuration of masses.	C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.
		C5	Practice research techniques and methods of investigation as an inherent part of learning.
		C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams
		C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.

7--Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Science and Scientific Research	2	2	0	C(5.1,5.2)
2	Fundamentals of scientific research	2	2	0	C(5.1,5.3)
3	Ways to gain knowledge	2	2	0	C(5.4,8.2,7.1, 5.٥,8.3,7.2)
4	Research hypotheses and their formulation	2	2	0	C(5.2,7.1,8.1)
5	Scientific research tools	2	2	0	C(5.2,7.1,8.1)
6	Steps to configure the research tool	2	2	0	C(5.2,7.1,8.1)
7	characteristics of the research tool				C(7.1,8.1)
8	Midterm		1.0		
9	Research Methods	2	2	0	C(5.2,7.1,8.1)
10	Research Categories	2	2	0	C(5.2,7.1,8.1)
11	The study Community and samples	2	2	0	C(5.2,7.1,8.15.4,8.2,7.1)
12	Steps to prepare the research and write the report	2	2	0	C(5.2,7.1,8.1)
13	Organizing the research and writing its report	2	2	0	C(5.2,7.1,8.1)
14	Qualities of a good researcher	2	2	0	C(5.2,7.1,8.1)
15	Revision	2	2	0	C(5.2,7.1,8.15.4,8.2,7.1)
16	Final Exam		2.0		

Total hours	28	28	0	--

8-The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	Teaching and Learning Methods												
	On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	Discovering / Self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
C(5.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
C(5.2)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
C(5.3)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
C(7.1,8.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
C(5.4,8.2,7.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
C(5.°,8.3,7.2)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓

Notes:

The research concerns the cooperative work, the discussion, the site visit and the presentations.
The Tutorials concerns the brain storming and the problem solving.
Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

9-Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
C(5.1)											
C(5.2)											
C(5.3)	✓	✓	✓	✓	✓		✓		✓		✓
C(7.1, 8.1)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
C(5.4, 8.2,7.1)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
C(5.٥, 8.3,7.2)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

a- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		weekly
Sheets and Sketches		weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		weekly
Mid-term exam		Week (8)
final exam		Week (16)

b- Grading system

quizes	Quiz (1)	(5) marks	
	Quiz (2)	(5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	10 marks	(50) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(10) marks	
Mid-term exam		(20) marks	

final exam	(50) marks
Total	(100) marks

a) Course notes	Lecture notes and handouts
b) Required books	Murdoch-Eaton, Deborah, et al. "What do medical students understand by research and research skills? Identifying research opportunities within undergraduate projects." Medical Teacher 32.3 (2010): e152-e160.
c) Recommend books	The Research Methods Knowledge Base, 5th Edition, by William M. K. Trochim (Author), James P. Donnelly
d) Periodicals, Web sites, etc	**Sites. https://www.educatorstechnology.com/2017/04/12-of-best-research-methodology.html**

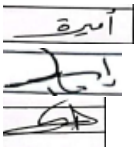
10-Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

11- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Course coordinator:	Dr. Amera Marei
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023



Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course specification

Course code:	Course name
BASE 404	Negotiation Skills
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Basic science
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	**2022-2023**

B-Basic Information

Course Name	Negotiation Skills
Code	BASE 404
Course Level	Fourth level courses (Senior-1) - First semester (Fall)
Credit Hours	3Cr. hr
Lectures	3hr
Tutorial	0hr
Total	3hr
Prerequisite	-
Instructor name/Email	Dr. Amera Marei amira.morai@sva.edu.eg

C- Professional information

1- Course core

Negotiation styles and processes to help students conduct and review negotiations. Workshop format integrating intellectual and experiential learning. Exercises, live and field examples, individual and small group reviews.

2- Course learning objectives:

oc 1	explain how to get general overview, what are negotiations and why do we need them? What do business teams negotiate?
oc 2	Recognize how apply the following :- ▪ Preparation and planning. ▪ Definition of ground rules. ▪ Clarification and justification. ▪ Bargaining and problem-solving. ▪ Closure and implementation.
oc 3	Recognize the following points:-

	▪ The negotiating process is continual, not an individual event. ▪ Think positive, ▪ Prepare, Think about the best & worst outcome before the negotiations begin, ▪ Be articulate & build value. ▪ Give & take
oc 4	Recognize the concepts of the following:- ▪ Planning for conflict, Planning for cooperation, Negotiation steps. ▪ Model of the schematic structure. ▪ The most famous negotiation strategies. ▪ The main important things in the negotiation plan. ▪ Negotiating climate. ▪ Good preparation for negotiation. ▪ Tactics in the negotiation process. ▪ Elements of tactics
oc 5	Recognize how to apply :- ▪ Negotiation policies. ▪ Characteristics and specifications of a professional negotiator. ▪ Principles of negotiation
oc 6	Recognize the basic of :- ▪ Basic negotiation skills. ▪ Qualities of a successful negotiator, Positional characteristics. ▪ Personal characteristics, Effective negotiator behaviors. ▪ The cultural dimension in the negotiation process. ▪ The impact of the cultural dimension on the negotiation process.
oc 7	explain the basic of the following:- ▪ Collective bargaining is the process by which working people, through their unions, negotiate contracts with their employers to determine their terms of employment, including pay, benefits, hours, leave, job health and safety policies, ways to balance work and family, and more. ▪ Collective bargaining is a way to solve workplace problems. ▪ It is also the best means for raising wages in America. ▪ Indeed, through collective bargaining, working people in unions have higher wages, better benefits, and safer workplaces.
oc 8	differentiate between the four Dimensions of Culture to Consider in International Negotiations: ▪ Power Distance. ▪ Individualism/Collectivism, ▪ Masculinity/Femininity.

- Uncertainty Avoidance

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 1	Know the basic negotiation Skills
OP 2	Explain the stages of negotiation
OP 3	Practice on the negotiation strategies
OP 4	Know how to planning the negotiation process
OP 5	Explain the importance of negotiation science
OP 6	Develop the Characteristics and skills of a successful negotiator
OP 7	Know the basic of the collective negotiations in the field of work
OP 8	Declare the impact of cultural differences on the negotiation process

4- The relation between the course objectives and the program objectives

	Course objectives	program objectives
oc 1	explain how to get general overview, what are negotiations and why do we need them? What do business teams negotiate?	OP 1 Know the basic negotiation Skills
oc 2	Recognize how apply the following :- ▪ Preparation and planning. ▪ Definition of ground rules. ▪ Clarification and justification. ▪ Bargaining and problem-solving. ▪ Closure and implementation.	OP 2 Explain the stages of negotiation
oc 3	Recognize the following points:- ▪ The negotiating process is continual, not an individual event. ▪ Think positive, ▪ Prepare, Think about the best & worst outcome before the negotiations begin, ▪ Be articulate & build value. ▪ Give & take	OP 3 Practice on the negotiation strategies

oc 4	Recognize the concepts of the following:- ▪ Planning for conflict, Planning for cooperation, Negotiation steps. ▪ Model of the schematic structure. ▪ The most famous negotiation strategies. ▪ The main important things in the negotiation plan. ▪ Negotiating climate. ▪ Good preparation for negotiation. ▪ Tactics in the negotiation process. ▪ Elements of tactics	OP 4	Know how to planning the negotiation process
oc 5	Recognize how to apply :- ▪ Negotiation policies. ▪ Characteristics and specifications of a professional negotiator. ▪ Principles of negotiation	OP 5	Explain the importance of negotiation science
oc 6	Recognize the basic of :- ▪ Basic negotiation skills. ▪ Qualities of a successful negotiator, Positional characteristics. ▪ Personal characteristics, Effective negotiator behaviors. ▪ The cultural dimension in the negotiation process. ▪ The impact of the cultural dimension on the negotiation process.	OP 6	Develop the Characteristics and skills of a successful negotiator
oc 7	explain the basic of the following:- ▪ Collective bargaining is the process by which working	OP 7	Know the basic of the collective negotiations in the field of work

	people, through their unions, negotiate contracts with their employers to determine their terms of employment, including pay, benefits, hours, leave, job health and safety policies, ways to balance work and family, and more. ▪ Collective bargaining is a way to solve workplace problems. ▪ It is also the best means for raising wages in America. ▪ Indeed, through collective bargaining, working people in unions have higher wages, better benefits, and safer workplaces.	
oc 8	differentiate between the four Dimensions of Culture to Consider in International Negotiations: ▪ Power Distance. ▪ Individualism/Collectivism, ▪ Masculinity/Femininity. ▪ Uncertainty Avoidance	OP 8 Declare the impact of cultural differences on the negotiation process

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

C(7.1,8.1)	Identifies the basic skills to produce effective persuasive writing with a focus on organization, content, analysis of readings, and critical thinking. Provides training in the use and integration of sources, library, and online research.
C(7.2,8.2)	Communicate effectively with a systematic framework for understanding negotiation.
C(7.3,8.3)	Express how to expand the size of the pie by creating value in negotiations, gain problem-solving techniques for distributing value and strengthening relationships.
C(7.4,8.4)	Explain the heighten awareness of their strengths and weaknesses as a negotiator
C(7.5,8.5)	Communicate effectively with experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C(10.1)	Express through an oral presentation and a flexible model recalling the final configuration of masses.

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.
C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools
C10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

1- The relation between the course learning outcomes and the program competencies

Course (LOs)		program competencies	
C(7.1,8.1)	Identifies the basic skills to produce effective persuasive writing with a focus on organization, content, analysis of readings, and critical thinking. Provides training in the use and integration of sources, library, and online research. Communicate effectively with a systematic framework for understanding negotiation.	C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.
		C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools
C(7.2,8.2)	Express how to expand the size of the pie by creating value in negotiations, gain problem-solving techniques for distributing value and strengthening relationships. Explain the heighten awareness of their strengths and weaknesses as a negotiator	C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.
		C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools
C(7.3,8.3)	Communicate effectively with experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering	C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.

	judgment to draw conclusions.	C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools
C(7.4,8.4)	Identifies the basic skills to produce effective persuasive writing with a focus on organization, content, analysis of readings, and critical thinking. Provides training in the use and integration of sources, library, and online research. Communicate effectively with a systematic framework for understanding negotiation.	C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.
		C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools
C(7.5,8.5)	Express how to expand the size of the pie by creating value in negotiations, gain problem-solving techniques for distributing value and strengthening relationships. Explain the heighten awareness of their strengths and weaknesses as a negotiator	C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams.
		C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools
C(10.1)	Communicate effectively with experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.	C10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies.

7- Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Negotiation Skills	3	0	0	C(7.1,8.1, 7.2,8.2)
2	General overview	3	0	0	C(7.2,8.2,7.3,8.3)
3	What do business teams negotiate?	3	0	0	C(7.5,8.5, 10.1)
4	Stages of negotiation	3	0	0	C(7.2,8.2,7.4,8.4)
5	Preparation and planning	3	0	0	C(7.2,8.2,7.4,8.4)
6	Negotiation strategies	3	0	0	C(7.2,8.2,7.4,8.4)
7	Planning the negotiation process	3	0	0	C(7.4,8.4)
8	Midterm		1.0		
9	The importance of negotiation science	3	0	0	C(7.2,8.2,7.4,8.4)
10	Characteristics and skills of a successful negotiator	3	0	0	C(7.2,8.2,7.4,8.4)
11	Collective negotiations in the field of work	3	0	0	Lo2, Lo5
12	The impact of cultural differences on the negotiation process	3	0	0	C(7.2,8.2,7.4,8.4)
13	Salary negotiation skills	3	0	0	C(7.2,8.2,7.4,8.4)
14	Essential Salary Negotiation Tips	3	0	0	C(7.2,8.2,7.4,8.4)
15	Revision	3	0	0	C(7.2,8.2,7.4,8.4, 7.5,8.5)

16	Final Exam			2.0		
Total hours		42	0	0	--	

8- The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	Teaching and Learning Methods												
	On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	Discovering / self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
C(7.1,8.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(7.2,8.2)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(7.3,8.3)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(7.4,8.4)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(7.5,8.5)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(10.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	

Notes:

The research concerns the cooperative work, the discussion and the presentations.
The Tutorials concerns the brain storming and the problem solving.
Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

9- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment										
	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
C(7.1,8.1)	✓	✓		✓	✓			✓	✓	✓	

C(7.2,8.2)	✓	✓		✓	✓				✓	✓	✓	
C(7.3,8.3)	✓	✓		✓	✓			✓	✓	✓	✓	
C(7.4,8.4)	✓	✓		✓	✓			✓	✓	✓	✓	
C(7.5,8.5)	✓	✓		✓	✓			✓	✓	✓	✓	
C(10.1)	✓	✓		✓	✓			✓	✓	✓	✓	

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		weekly
Sheets and Sketches		weekly
Researches and reports		Week (2,3)
Attendance		weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system

quizes	Quiz (1)	(5) marks		
	Quiz (2)	(5) marks		
Discussions	30%			
Sheets and Sketches	35%	10 marks		(50) marks
Researches and reports	35%			
Attendance		(10) marks		
Mid-term exam		(20) marks		
final exam			(50) marks	
Total			(100) marks	

10- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	Gammie, Bob, Elizabeth Gammie, and Erica Cargill. "Personal skills development in the accounting curriculum." Accounting Education 11.1 (2002): 63-78.
c) Recommend books	Rebel Talent: Why It Pays to Break the Rules at Work and in Life, by Francesca Gino
d) Periodicals, Web sites, etc	**Sites: https://www.pon.harvard.edu/daily/negotiation-training-daily/negotiation-books-a-negotiation-reading-list/**

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Course coordinator:	Dr. Amera Marei
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023

Fourth level courses (Senior-1)

Second semester (Spring)

No.	Cod	Course Name	Instructor
1	CECE 318	Electric Machine II	Ass. Prof. Dr. Shady Abdel Aleem
2	CECE 320	Power Electronics II	Dr. Mostafa Hassan Mostafa Abdel-Gawad
3	CECE 430	Transmission & Distribution of Electrical Energy	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
4	CECE 322	Power System Analysis I	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
5	ENGR 303	General Mechanical Engineering-Applied Thermodynamics	Prof. Dr. Al-Desouki Ibrahim Saleh Eid
6	BASE 401	Communication Skills	Dr. Amera Marei

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course specification

Course code:	Course name
CECE 318	Electric Machine II
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Electrical and communication engineering
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B-Basic Information

Course Name	Electric Machine II
Code	CECE 318
Course Level	Fourth level courses (Senior-1) - Second semester (Spring)
Credit Hours	3Cr. Hr
Lectures	2hr
Tutorial	2hr
Lab	2hr
Total	6hr
Prerequisite	CECE 317
Instructor name/Email	Ass. Prof. Dr. Shady Abdel Aleem Shady.Sebai@sva.edu.eg

C- Professional information

1- Course core

Transformers : Theory and design : Fundamental concepts, Mutual inductance, Electric and magnetic circuits, Power transformers, Phasor diagrams, Magnetizing current and core loss, Equivalent circuits, Transformers at load, Efficiency, Voltage regulation, Three phase transformers, Three phase transformer connections, Three phase to two phase connections, Auto transformer, Voltage regulation in auto transformers, Tap changers, On load tap changers, Harmonics, Transformers testing, Transformer design, Main dimensions, Magnetic cores, Transformer windings, Insulation, Cooling, Calculation of transformer characteristics, Examples on transformer design.

2- Course learning objectives:

oc 1	Recognize the Transformers: Conserving Energy Resources, Power factor correction, Theory and design, Transformer Construction, Core Type Transformer, Shell Type Transformer, and Core Shell Type Transformers.

oc 2	Recognize the transformer Principal operation, Turns and Voltage Ratio, Power and Current, Reflected Impedance, Step-Down Transformer, Step-Up Transformer.
oc 3	Recognize the Practical Transformers, Equivalent circuits, Power transformers, Transformer Taps, Phasor Diagram (Lag & Lead & Unit PF) Transformers at load, Examples of Per Unit System, Base value of transformers, Transforming to per unit, Efficiency, Voltage regulation.
oc 4	Recognize the autotransformer, Construction, Continuation, Types of Autotransformers, Principle of Operation, Comparing autotransformer with two winding transformer, Theory, VA rating of auto-transformers, Conversion of Two-Winding Transformer into Autotransformer.
oc 5	Recognize the parallel operation of a transformer, Reasons for Parallel Operation, Necessary Conditions for Parallel Operation, Load Share.
oc6	Recognize the three phase transformers, Power in Three-phase Transformers, Three phase transformer connections (Y-Y & Δ-Δ & Δ-Y & Y-Δ Connection), Three phases to two phase connections, Transformers testing, Calculation of transformer characteristics, and Examples on transformer design.

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

4- The relation between the course objectives and the program objectives

	Course objectives	program objectives	
oc 1	Recognize the Transformers: Conserving Energy Resources, Power factor correction, Theory and design, Transformer Construction, Core Type Transformer, Shell Type Transformer, and Core Shell Type Transformers.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 2	Recognize the transformer Principal operation, Turns and Voltage Ratio, Power and Current, Reflected Impedance, Step-Down Transformer, Step-Up Transformer.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.

oc 3	Recognize the Practical Transformers, Equivalent circuits, Power transformers, Transformer Taps, Phasor Diagram (Lag & Lead & Unit PF) Transformers at load, Examples of Per Unit System, Base value of transformers, Transforming to per unit, Efficiency, Voltage regulation.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 4	Recognize the autotransformer, Construction, Continuation, Types of Autotransformers, Principle of Operation, Comparing autotransformer with two winding transformer, Theory, VA rating of auto-transformers, Conversion of Two-Winding Transformer into Autotransformer.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 5	Recognize the parallel operation of a transformer, Reasons for Parallel Operation, Necessary Conditions for Parallel Operation, Load Share.	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
		OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
oc6	Recognize the three phase transformers, Power in Three-phase Transformers, Three phase transformer connections (Y-Y & Δ-Δ & Δ-Y & Y-Δ Connection), Three phases to two phase connections, Transformers testing, Calculation of transformer characteristics, and Examples on transformer design.	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
		OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
		OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

CS(2.1)	Recognize the Transformers: Conserving Energy Resources, Power factor correction, Theory and design, Transformer Construction, Core Type Transformer, Shell Type Transformer, and Core Shell Type Transformers.
CS(2.2)	Determine The Transformer Principle, Turns and Voltage Ratio, Power and Current, Reflected Impedance, Step-Down Transformer, Step-Up Transformer.
CS(2.3,3.1)	Apply knowledge to Sketch the Practical Transformers, Equivalent circuits, Power transformers, Transformer Taps, Phasor Diagram (Lag & Lead & Unit PF) Transformers at load, Examples of Per Unit System, Base value of transformers, Transforming to per unit, Efficiency, Voltage regulation.
CS(2.4,3.2)	Apply knowledge to Calculate characteristics 'of Autotransformer, Construction, Continuation, Types of Autotransformers, Principle of Operation, Comparing autotransformer with two winding transformer, Theory, VA rating of auto-transformers, Conversion of Two-Winding Transformer Into Autotransformer.
CS(2.5,3.3)	Apply knowledge to Obtain Parallel operation of a transformer, Reasons for Parallel Operation, Necessary Conditions For Parallel Operation, Load Share.
CS(2.6,3.4)	Express the Design Three phase transformers, Power in Three-phase Transformers, Three phase transformer connections (Y-Y & Δ-Δ & Δ-Y & Y-Δ Connection), Three phases to two phase connections, Transformers testing, Calculation of transformer characteristics, and Examples on transformer design.

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.

7- The relation between the course learning outcomes and the program competencies

Course (LOs)		program competencies	
CS(2.1)	Recognize the Transformers: Conserving Energy Resources, Power factor correction, Theory and design, Transformer Construction, Core Type Transformer, Shell Type	CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.

	Transformer, and Core Shell Type Transformers.		
CS(2.2)	Determine The Transformer Principle, Turns and Voltage Ratio, Power and Current, Reflected Impedance, Step-Down Transformer, Step-Up Transformer.	CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS(2.3,3.1)	Apply knowledge to Sketch the Practical Transformers, Equivalent circuits, Power transformers, Transformer Taps, Phasor Diagram (Lag & Lead & Unit PF) Transformers at load, Examples of Per Unit System, Base value of transformers, Transforming to per unit, Efficiency, Voltage regulation.	CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.
		CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS(2.4,3.2)	Apply knowledge to Calculate characteristics ‘of Autotransformer, Construction, Continuation, Types of Autotransformers, Principle of Operation, Comparing autotransformer with two winding transformer, Theory, VA rating of auto-transformers, Conversion of Two-Winding Transformer Into Autotransformer.	CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
		CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.
CS(2.5,3.3)	Apply knowledge to Obtain Parallel operation of a transformer, Reasons for Parallel Operation,	CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing

CS(2.6,3.4)	Necessary Conditions For Parallel Operation, Load Share		systems to interpret experimental results.
		CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.
	Express the Design Three phase transformers, Power in Three-phase Transformers, Three phase transformer connections (Y-Y & Δ-Δ & Δ-Y & Y-Δ Connection), Three phases to two phase connections, Transformers testing, Calculation of transformer characteristics, and Examples on transformer design.	CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
		CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.

8- Course content and the relation between the course contents and the course Los

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course Los
1	Introduction: Conserving Energy Resources, Power factor correction, Theory and design, Transformer Construction, Core Type Transformer, Shell Type Transformer, Core Shell Type Transformers,	2	2	2	CS(2.1)
2	The Transformer Principle, Turns and Voltage Ratio, Power and Current, Reflected Impedance, Step-Down Transformer, Step-Up Transformer.	2	2	2	CS(2.1)
3	Practical Transformers, Equivalent circuits, Power transformers, Transformer Taps, Phasor Diagram (Lag & Lead & Unit PF) Transformers at load.	2	2	2	CS(2.1)
4	Quiz (1) + Examples of Per Unit System, Base value of transformers, Transforming to per unit.	2	2	2	CS(2.2)
5	Focuses on Transformer efficiency, Voltage regulation.	2	2	2	CS(2.3,3.1)
6	Focuses on Autotransformer, Construction, Continuation, Types of Autotransformers, Principle of Operation, Comparing autotransformer with two winding transformer, Theory, VA rating of auto-transformers, Conversion of Two-Winding Transformer into Autotransformer.	2	2	2	CS(2.3,3.1)
7	Parallel operation of a transformer, Reasons for Parallel Operation, Necessary Conditions for Parallel Operation, Load Share.	2	2	2	CS(2.3,3.1)
8	Midterm		1.0		
9	Focuses on Three phase transformers, Power in Three-phase Transformers, Three phase transformer connections (Y-Y & Δ-Δ & Δ-Y & Y-Δ Connection).	2	2	2	CS(2.4,3.2)
10	Three phases to two phase connections, Transformers testing.	2	2	2	CS(2.4,3.2)
11	Focuses on Calculation of transformer characteristics, Examples on transformer design.	2	2	2	CS(2.5,3.3)
12	Quiz (2) + Examples on transformer design.	2	2	2	CS(2.6,3.4)
13	Focuses on Examples of Per Unit System, Base value of transformers, Transforming to per unit.	2	2	2	CS(2.6,3.4)
14	Focuses on Solved examples Phasor Diagram (Lag & Lead & Unit PF) Transformers at load.	2	2	2	CS(2.3,3.1)
15	Focuses on Applications of auto-transformer and transforming to per unit examples.	2	2	2	CS(2.5,3.3)
16	Final Exam		2.0		
Total hours		28	28	28	--

9- The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	Teaching and Learning Methods: On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	discovering	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
CS(2.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(2.2)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(2.3,3.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(2.4,3.2)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(2.5,3.3)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(2.6,3.4)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Notes:

The research concerns the cooperative work, the discussion and the presentations.
The Tutorials concerns the brain storming and the problem solving.
Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

10- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment: quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
CS(2.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(2.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(2.3,3.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(2.4,3.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(2.5,3.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

CS(2.6,3.4)	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		weekly
Sheets and Sketches		weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system

quizes	Quiz (1)	(5) marks	
	Quiz (2)	(5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	5 marks	(40) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(10) marks	
Mid-term exam		(15) marks	
final exam			(60) marks
Total			(100) marks

10- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	P.C.SEN," Principles of electrical machines and power electronics, second edition, John Wiley& Sons
c) Recommend books	Mentioned at time.
d) Periodicals, Web sites, etc	No periodicals are needed.

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course coordinator:	Ass. Prof. Dr. Shady Abdel Aleem
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023

Course specification

Course code:	Course name
CECE 320	Power Electronics II
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Electrical and communication engineering
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B-Basic Information

Course Name	Power Electronics II
Code	CECE 320
Course Level	Fourth level courses (Senior-1) - Second semester (Spring)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Lab	2hr
Total	6hr
Prerequisite	CECE 319
Instructor name/Email	Dr. Mostafa Hassan Mostafa Abdel-Gawad drmostafa.hassan@sva.edu.eg

C- Professional information

1- Course learning objectives:

oc 1	identify students with the power electronics, Ac voltage controllers.
oc 2	Recognize the Characteristics The single-phase ac Thyristors controller (R-load & RL-load).
oc 3	Recognize the Three-phase controller, Phase control of ac controllers, Integral cycle control
oc 4	recognize the Thyristors commutation techniques: Natural commutation, Forced commutation, Main principles, Circuits, Dc choppers: The single Thyristors chopper, Two Thyristors chopper, Inverters: Single phase circuits, Bridge inverter circuits, Dc drives, Ac drives.

2- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.

OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

3- The relation between the course objectives and the program objectives

	Course objectives	**program objectives**	
oc 1	identify students with the power electronics, Ac voltage controllers.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 2	Recognize the Characteristics The single-phase ac Thyristors controller (R-load & RL-load).	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
		OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
oc 3	Recognize the Three-phase controller, Phase control of ac controllers, Integral cycle control	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
		OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
oc 4	recognize the Thyristors commutation techniques: Natural commutation, Forced commutation, Main principles, Circuits, Dc choppers: The single Thyristors chopper, Two Thyristors chopper, Inverters:	OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

	Single phase circuits, Bridge inverter circuits, Dc drives, Ac drives.

4- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

CS(1.1)	Identify students with the power electronics, Ac voltage controllers.
CS(1.2)	Recognize the single-phase ac Thyristors controller (R-load & RL-load) characteristics.
CS(1.3,3.1)	Prepare students for design the Three phase controller, Phase control of ac controllers, Integral cycle control
CS(1.4,3.2)	Apply acknowledge to Obtain the Thyristors commutation techniques: Natural commutation, Forced commutation, Main principles, Circuits, Dc choppers.
CS(1.5,3.3)	Communicate effectively with single Thyristors chopper, Two Thyristors chopper, Inverters: Single phase circuits, Bridge inverter circuits, Dc drives, Ac drives

5- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.

6- The relation between the course learning outcomes and the program competencies

Course (LOs)		program competencies	
CS(1.1)	Identify students with the power electronics, Ac voltage controllers.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS(1.2)	Recognize the single-phase ac Thyristors controller (R-load & RL-load) characteristics.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS(1.3,3.1)	Prepare students for design the Three phase controller, Phase control of ac controllers, Integral cycle control	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.

		CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.
CS(1.4,3.2)	Apply acknowledge to Obtain the Thyristors commutation techniques: Natural commutation, Forced commutation, Main principles, Circuits, Dc choppers.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
		CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.
CS(1.5,3.3)	Communicate effectively with single Thyristors chopper, Two Thyristors chopper, Inverters: Single phase circuits, Bridge inverter circuits, Dc drives, Ac drives	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
		CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.

7- Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Introduction: Ac voltage controllers.	2	2	2	CS(1.2)
2	Focuses on the single-phase ac Thyristors controller (R-load characteristics).	2	2	2	CS(1.2)
3	Focuses on the single-phase ac Thyristors controller (RL-load characteristics).	2	2	2	CS(1.2)
4	Quiz (1) + Focuses on design the Three phase controller, Phase control of ac controllers, Integral cycle control	2	2	2	CS(1.1)
5	Focuses on Thyristors commutation techniques: Natural commutation, Forced commutation.	2	2	2	CS(1.1)
6	Focuses on Main principles, Circuits, Dc choppers.	2	2	2	CS(1.3,3.1)
7	Focuses on single Thyristors chopper, Two Thyristors chopper.	2	2	2	CS(1.3,3.1)
8	Midterm		1.0		
9	Focuses on Two Thyristors chopper, Inverters.	2	2	2	CS(1.4,3.2)
10	Focuses on Single phase circuits.	2	2	2	CS(1.4,3.2)

11	Focuses on Single phase circuits, Bridge inverter circuits, Dc drives, Ac drives.	2	2	2	CS(1.5,3.3)
13	Quiz (2) + Focuses on design the Three phase controller, Phase control of ac controllers, Integral cycle control	2	2	2	CS(1.1)
14	Review on main principles, Circuits, Dc choppers.	2	2	2	CS(1.3,3.1)
15	Review on single Thyristors chopper, Two Thyristors chopper.	2	2	2	CS(1.3,3.1)
16	Final Exam		2.0		
Total hours		20	20	20	--

8- The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	Teaching and Learning Methods												
	On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	Discovering / Self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
CS(1.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.2)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.3,3.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.4,3.2)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.5,3.3)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Notes:

The research concerns the cooperative work, the discussion and the presentations.

The Tutorials concerns the brain storming and the problem solving.

Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

9- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment										
	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
CS(1.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.3,3.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.4,3.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.5,3.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

b- Time schedule of assessment		
Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		weekly
Sheets and Sketches		weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system			
quizes	Quiz (1)	(5) marks	
	Quiz (2)	(5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	5 marks	(40) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(10) marks	
Mid-term exam		(15) marks	
final exam			(60) marks
Total			(100) marks

10- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	▪ Adel S. Sedra, Kenneth C. Smith, "Microelectronic Circuits", 6th Edition, Oxford University Press, 2011. ▪ Behazad Rzavi, "Fundamentals of Microelectronics", 2nd edition, John Wiley, 2013. ▪ Thomas L. Floyd, "Electronic Devices", Prentice Hall, 9th edition, 2011. ▪ Donald Neamen, "Microelectronics: Circuit Analysis & Design", 4th edition, Mcgraw Hill, 2009.
c) Recommend books	Mentioned at time.
d) Periodicals, Web sites, etc	No periodicals are needed.

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom

- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Course coordinator:	Dr. Mostafa Hassan Mostafa Abdel-Gawad
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course specification

Course code:	Course name
CECE 430	Transmission & Distribution of Electrical Energy
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Electrical and communication engineering
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B-Basic Information

Course Name	Transmission & Distribution of Electrical Energy
Code	CECE 430
Course Level	Fourth level courses (Senior-1) - Second semester (Spring)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Total	4hr
Prerequisite	CECE 309
Instructor name/Email	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul ihab.nabil@sva.edu.eg

C- Professional information

1- Course core

Introduction, Representation of power systems, Parameters of transmission lines, Models of transmission lines, Series impedance, Electrical capacitance, Representation of capacitance in parallel with transmission lines, Voltage and current relationships in transmission lines, Operation characteristics, Symmetrical components, Unsymmetrical faults on transmission lines, Introduction to underground cables, Design of transmission lines, Mechanical design, High- voltage dc overhead transmission lines, Insulated electrical cables, Determination of faults in underground cables, Design of electrical distribution systems, Substations, Introduction to power system planning.

2- Course learning objectives:

oc 1	recognize the knowledge of the main elements of power systems
oc 2	explain the definition of the parameters of the transmission lines such as series impedance, electrical capacitance.
oc 3	describe the models of transmission lines based on the line length and how can they be calculated.
oc 4	recognize the representation of capacitance in parallel with transmission lines.

oc 5	Describe the voltage and current relationships in transmission lines and operation characteristics.
oc6	recognize the Extra High Voltage Transmission lines.
oc7	recognize the A.C distribution System

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

4- The relation between the course objectives and the program objectives

	Course objectives	program objectives	
oc 1	recognize the knowledge of the main elements of power systems	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 2	explain the definition of the parameters of the transmission lines such as series impedance, electrical capacitance.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 3	describe the models of transmission lines based on the line length and how can they be calculated.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 4	recognize the representation of capacitance in parallel with transmission lines.	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
oc 5	Describe the voltage and current relationships in transmission lines and operation characteristics.	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using

			design and syntheses of electrical components, circuits, and systems.
oc6	recognize the Extra High Voltage Transmission lines.	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
		OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.
oc7	recognize the Extra High Voltage Transmission lines.	OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

CS(1.1)	Identify the different types of transmission systems
CS(1.2)	recognize the electrical characteristics of transmission lines
CS(2.1)	recognize the different models that can be used with transmission lines
CS(3.1)	Apply knowledge for Identifying the relation between the electrical quantities at the sending and receiving ends of a transmission line
CS(6.1,7.1)	Apply knowledge for calculating the power loss and voltage drop in distribution networks
CS(6.2,7.2)	communicate effectively with the different types of transmission systems

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.

CS6	Review supplier documentation for compliance with specifications for electric power components of generation, transmission, control, and distribution systems
CS7	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.

1- The relation between the course learning outcomes and the program competencies

Course (LOs)		program competencies	
CS(1.1)	Identify the different types of transmission systems	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS(1.2)	recognize the electrical characteristics of transmission lines	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS(2.1)	recognize the different models that can be used with transmission lines	CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS(3.1)	Apply knowledge for Identifying the relation between the electrical quantities at the sending and receiving ends of a transmission line	CS3	Identify problems and formulate engineering solutions to manage the engineering activity during the diverse phases of electric power generation, transmission, control, and distribution systems.
CS(6.1,7.1)	Apply knowledge for calculating the power loss and voltage drop in distribution networks	CS6	Review supplier documentation for compliance with specifications for electric power components of generation, transmission, control, and distribution systems
		CS7	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.

CS(6.2,7.2)	communicate effectively with the different types of transmission systems	CS6	Review supplier documentation for compliance with specifications for electric power components of generation, transmission, control, and distribution systems
		CS7	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.

7- Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Introduction: Introduction to a power system.	2	2	0	CS(1.1)
2	Focuses on Electrical transmission line parameters	2	2	0	CS(1.1)
3	Focuses on Inductance and inductive reactance.				CS(1.1)
	Capacitance and capacitive reactance. Equivalent circuits for transmission line such as short, medium, and long length.	2	2	0	
4	Quiz (1) + Surge Impedance Loading (SIL) of the transmission line.	2	2	0	CS(1.2)
5	Networks connected in series and parallel. Voltage, current, and power relations of the transmission line.	2	2	0	CS(2.1)
6	Focuses on Extra High Voltage Transmission.	2	2	0	CS(2.1)
7	Focuses on Mechanical design of an overhead transmission line.				CS(3.1)
8	Midterm		1.0		
9	Mechanical design factors affecting overhead Line Conductor motion caused by fault currents	2	2	0	CS(6.1,7.1)
10	Focuses on Design of electrical distribution system	2	2	0	CS(6.1,7.1)
11	Focuses on Distribution system planning and automation.	2	2	0	CS(6.2,7.2)
12	Design of Load characteristics. Application of distribution transformers.	2	2	0	CS(6.2,7.2)
13	Focuses on Focuses on Design of sub transmission lines and distribution substation.	2	2	0	CS(6.2,7.2)
14	Quiz (2) + Design consideration of primary and secondary substations.	2	2	0	CS(6.1,7.1)
15	Focuses on Application of capacitors to distribution systems. Distribution system voltage regulation and protection.	2	2	0	CS(6.1,7.1)
16	Final Exam		2.0		

Total hours	28	28	0	--

8- The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	Teaching and Learning Methods												
	On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	Discovering / self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
CS(1.1)	✓												
CS(1.2)	✓	✓											
CS(2.1)	✓	✓	✓	✓	✓		✓		✓	✓			✓
CS(3.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
CS(6.1,7.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
CS(6.2,7.2)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓

Notes:

The research concerns the cooperative work, the discussion and the presentations.
The Tutorials concerns the brain storming and the problem solving.
Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

9- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment										
	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
CS(1.1)											
CS(1.2)											
CS(2.1)	✓	✓	✓	✓	✓		✓		✓		✓
CS(3.1)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(6.1,7.1)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(6.2,7.2)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)

	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		weekly
Sheets and Sketches		weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system

quizes	Quiz (1) Quiz (2)	(5) marks (5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	5 marks	(40) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(10) marks	
Mid-term exam		(15) marks	
final exam			(60) marks
Total			(100) marks

10- List of references:

a) Course notes

Lecture notes and handouts

b) Required books

- Mohamed E. El-Hawary," Electrical Power Systems Design and Analysis - The Transmission Subsystem".
- William D. Stevenson, "Elements Of Power System Analysis" 4th Edition, Mc Graw Hill India, 2014 (Text Book)
- J. Duncan Glover, Mulukutla S. Sarma and Thomas Overbye, "Power Systems Analysis and Design, 5th Edition", CL Engineering, 2012
- Colin Bayliss and Brian Hardy, "Transmission and Distribution Electrical Engineering, Fourth Edition", Newnes, 2012
- John Grainger, William Stevenson Jr. "Power System Analysis", McGraw-Hill Education, 1994.

c) Recommend books

Mentioned at time.

d) Periodicals, Web sites, etc

No periodicals are needed.

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show

- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Course coordinator:	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course specification

Course code:	Course name
CECE 322	Power System Analysis I
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Electrical and communication engineering
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B-Basic Information

Course Name	Power System Analysis I
Code	CECE 322
Course Level	Fourth level courses (Senior-1) - Second semester (Spring)
Credit Hours	3Cr. Hr
Lectures	2hr
Tutorial	2hr
Lab	2hr
Total	4hr
Prerequisite	CECE 317
Instructor name/Email	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul ihab.nabil@sva.edu.eg

C- Professional information

1- Course core

Symmetrical components: Synthesis of unsymmetrical phasor diagrams from their symmetrical components, The symmetrical components of unsymmetrical systems, Power in terms of symmetrical components, Positive, negative and zero phase sequence networks, Unsymmetrical faults : Shunt faults, Series faults, Network matrices: Network topology, System admittance and system impedance matrices, Load flow solutions and control: Load flow equations, The Gauss- Seidel method, Newton-Raphson method and approximations, De-coupled methods, Regulating transformers

2- Course learning objectives:

oc 1	Recognize the power system operation under both normal and abnormal conditions.
oc 2	analyze power systems under normal operation and fault conditions.
oc 3	explain commercial software packages to study the normal operation of power systems.

oc 4	Recognize the experiments behaviour by using the power system simulator.

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications
OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.

4- The relation between the course objectives and the program objectives

Course objectives		program objectives	
oc 1	Recognize the power system operation under both normal and abnormal conditions.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
oc 2	analyze power systems under normal operation and fault conditions.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.
		OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
oc 3	explain commercial software packages to study the normal operation of power systems.	OP 5	Prepare students for engineering analyses and problem-solving using appropriate mathematical and computational methodologies.

oc 4	explain commercial software packages to study the normal operation of power systems.	OP 6	Prepare undergraduate students who can create new ways to meet society's needs by applying fundamentals of engineering sciences to practical problems using design and syntheses of electrical components, circuits, and systems.
		OP 12	Prepare engineers who can work on electrical power systems, including designing and realizing such systems.
		OP 7	Teach students to use experimental and data analysis techniques for electrical power engineering applications

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

CS(1.1)	Describe power flow equations in both rectangular and polar forms.
CS(1.2)	Explain the transformation from phase domain to symmetrical components domain and vice versa.
CS(1.3)	Identify the power system parameters from normal units to per unit and vice versa.
CS(1.4,2.1)	Solve power flow equations using Gauss-Seidel, Newton-Raphson and Fast-Decoupled methods.
CS(1.5,2.2)	Apply symmetrical components' method to analyze unsymmetrical three-phase circuits.
CS(1.6,2.3)	Solve the power systems under symmetrical and unsymmetrical faults.
CS(1.7,2.4,5.1)	Use power system simulator, collect, analyze and interpret results.
CS(5.2)	Apply modern techniques, skills and numerical modelling methods to power system analysis

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.

CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS5	Apply modern techniques, skills, and engineering tools while performing the development load lists, low voltage power systems, design reviews, and checks for electric power generation and distribution systems

7- The relation between the course learning outcomes and the program competencies

Course (LOs)		program competencies	
CS(1.1)	Describe power flow equations in both rectangular and polar forms.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS(1.2)	Explain the transformation from phase domain to symmetrical components domain and vice versa.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS(1.3)	Identify the power system parameters from normal units to per unit and vice versa.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
CS(1.4,2.1)	Solve power flow equations using Gauss-Seidel, Newton-Raphson and Fast-Decoupled methods.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
		CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS(1.5,2.2)	Apply symmetrical components' method to analyze unsymmetrical three-phase circuits.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
		CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing

			systems to interpret experimental results.
CS(1.6,2.3)	Solve the power systems under symmetrical and unsymmetrical faults.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
		CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
CS(1.7,2.4,5.1)	Use power system simulator, collect, analyze and interpret results.	CS1	Design and analyze the construction of systems to generate, transmit, control and distribution systems.
		CS2	Design, develop and make analysis through simulations for heavy equipment (generators, motors, transmission lines, and distributing systems to interpret experimental results.
		CS5	Apply modern techniques, skills, and engineering tools while performing the development load lists, low voltage power systems, design reviews, and checks for electric power generation and distribution systems
CS(5.2)	Apply modern techniques, skills and numerical modelling methods to power system analysis	CS5	Apply modern techniques, skills, and engineering tools while performing the development load lists, low voltage power systems, design reviews, and checks for electric power generation and distribution systems

8- Course content and the relation between the course contents and the course Los

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course Los
1	Introduction: Modern Power System Overview.	2	2	2	CS(1.1)
2	Characteristics of power system faults. Nature of faults. Types of faults. Causes of faults	2	2	2	CS(1.2)
3	Theory of symmetrical components and connection of phase sequence networks during faults.	2	2	2	CS(1.2)
4	Symmetrical components of a three-phase power system. Balanced three-phase voltage and current phasors. Symmetrical components of unbalanced voltage or current phasors.	2	2	2	CS(1.3)
5	Apparent power in symmetrical component terms. Sequence components of unbalanced three-phase impedances. Sequence components of balanced three-phase.	2	2	2	CS(1.4,2.1)
6	Analysis of balanced and unbalanced faults in the sequence reference frame + Quiz (1).	2	2	2	CS(1.5,2.2)
7	Balanced three-phase to earth short-circuit faults Unbalanced one-phase to earth short-circuit faults	2	2	2	CS(1.5,2.2)
8	Midterm		1.0		
9	Unbalanced phase-to-phase or two-phase short-circuit faults. Unbalanced two-phase to earth short-circuit faults	2	2	2	CS(1.5,2.2 5.2)
10	The admittance model and network calculation. Branch and node admittances. Mutually coupled branches in Ybus.	2	2	2	CS(1.6,2.3)
11	An equivalent admittance networks. Modification of Ybus.	2	2	2	CS(1.6,2.3)
12	The impedance Model and network calculations. The bus admittance and impedance matrices Thevenin s theorem and Zbus.	2	2	2	CS(1.5,2.2)
13	Modification of an existing Zbus. Direct determination of Zbus. Calculation of Zbus element from Ybus.	2	2	2	CS(1.7,2.4 ,5.1)
14	Power-flow solution. The power-flow problem. The Gauss-Seidel method	2	2	2	CS(1.7,2.4 ,5.1)
15	The Newton-Raphson method. The Newton-Raphson power-flow solution.	2	2	2	CS(1.7,2.4 ,5.1)
16	Final Exam		2.0		
Total hours		28	28	28	--

9- The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	Teaching and Learning Methods												
	On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	Discovering / Self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
CS(1.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.2)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.3)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.4,2.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.5,2.2)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.6,2.3)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(1.7,2.4,5.1)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
CS(5.2)	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

Notes:

The research concerns the cooperative work, the discussion and the presentations.
The Tutorials concerns the brain storming and the problem solving.
Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

10- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment										
	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
CS(1.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.4,2.1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CS(1.5,2.2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

CS(1.6,2.3)	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
CS(1.7,2.4,5.1)	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
CS(5.2)	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		Weekly
Sheets and Sketches		Weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		Weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system

Quizzes	Quiz (1)	(5) marks	
	Quiz (2)	(5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	5 marks	(40) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(10) marks	
Mid-term exam		(15) marks	
final exam			(60) marks
Total			(100) marks

10- List of references:

a) Course notes — Lecture notes and handouts

b) Required books
- John J. Grainger, William D. Stevenson, and Jr.,"POWER SYSTEM ANALYSIS".
- Nasser D. Tleis," Power Systems Modelling and Fault Analysis".

c) Recommend books
- Hadi Saadat, "Power System Analysis", PSA Publishing, Third Edition, 2010.
- J. D. Glover, M. S. Sarma and T. J. Overbye, "Power System Analysis and Design", Cengage Learning, Fifth Edition, 2012.

d) Periodicals, Web sites, etc — No periodicals are needed.

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and research in specific topic

Course coordinator:	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course specification

Course code:	Course name
ENGR 303	General Mechanical Engineering- Applied Thermodynamics
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Basic Science
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B-Basic Information

Course Name	General Mechanical Engineering- Applied Thermodynamics
Code	ENGR 303
Course Level	Fourth level courses (Senior-1) - Second semester (Spring)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Total	4hr
Prerequisite	PHYS102 -MATH 201
Instructor name/Email	Prof.Dr. Al -Desouki Ibrahim Saleh Eid eldesuki.eid@sva.edu.eg

C- Professional information

1- Course core

Working fluid, The ideal gas, The first law of thermodynamics, Reversible processes, Irreversible processes. The second law of thermodynamics, Thermal cycles, Steam cycles, Entropy, fuel and combustion. Heat transfer by conduction, Forced convection, Heat transfer by radiation, Heat exchangers. Power generation plants, Heat cycles, Analysis and presentation on charts for pure substances, Steam units, Boilers, Steam turbines, Condensers, Pumps. Gas and combined units and operation of the gas turbine, Air compressors, Compound cycles, Heat recovery boilers from turbine exhaust gases. Diesel engine units, Performance and operation of diesel engines. Hydro-electric energy generation plants, Performance and operation of hydro-turbines.

2- Course learning objectives:

oc 1	Recognize the Fundamentals of Working fluid, The ideal gas, The first law of thermodynamics
oc 2	apply the Reversible processes, Irreversible processes.
oc 3	Conduct, develop and appropriate experiment discussion of The second law of thermodynamics

oc 4	Recognize the application of Thermal cycles, Steam cycles, Entropy, fuel and combustion
oc 5	analyze data, to deal with center of Heat exchangers
oc6	used to apply the analytics of Power generation plants, Heat cycles.
oc7	Recognize the application of Steam units, Boilers, Steam turbines Condensers, Pumps.
oc8	Recognize the gas and combined units and operation of the gas turbine,
oc9	Recognize the application of Air compressors, Compound cycles, Heat recovery boilers from turbine exhaust gases.

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 1	Know about working fluid, The ideal gas, The first law of thermodynamics,
OP 2	Understand reversible processes, Irreversible processes.
OP 3	Focus on learning the second law of thermodynamics,
OP 4	Be familiarity with thermal cycles, Steam cycles, Entropy, fuel and combustion.
OP5	Demonstrate the concept of heat transfer by conduction, forced convection, Heat transfer by radiation, Heat exchangers.
OP6	Demonstrate the concept of power generation plants, Heat cycles.
OP7	Analyze and presentation on charts for pure substances, Steam units, Boilers, Steam turbines Condensers, Pumps.
OP8	Understand Gas and combined units and operation of the gas turbine,
OP9	Explain principle operation of air compressors, Compound cycles, and Heat recovery boilers from turbine exhaust gases.

4- The relation between the course objectives and the program objectives

	Course objectives		program objectives
oc 1	Recognize the Fundamentals of Working fluid, The ideal gas, The first law of thermodynamics	OP 1	Know about working fluid, The ideal gas, The first law of thermodynamics,
oc 2	apply the Reversible processes, Irreversible processes.	OP 2	Understand reversible processes, Irreversible processes.
oc 3	Conduct, develop and appropriate experiment discussion of The second law of thermodynamics	OP 3	Focus on learning the second law of thermodynamics,
oc 4	Recognize the application of Thermal cycles, Steam cycles, Entropy, fuel and combustion	OP 4	Be familiarity with thermal cycles, Steam cycles, Entropy, fuel and combustion.

oc 5	analyze data, to deal with center of Heat exchangers	OP5	Demonstrate the concept of heat transfer by conduction, forced convection, Heat transfer by radiation, Heat exchangers.
oc6	used to apply the analytics of Power generation plants, Heat cycles.	OP6	Demonstrate the concept of power generation plants, Heat cycles.
oc7	Recognize the application of Steam units, Boilers, Steam turbines Condensers, Pumps.	OP7	Analyze and presentation on charts for pure substances, Steam units, Boilers, Steam turbines Condensers, Pumps.
oc8	Recognize the gas and combined units and operation of the gas turbine,	OP8	Understand Gas and combined units and operation of the gas turbine,
oc9	Recognize the application of Air compressors, Compound cycles, Heat recovery boilers from turbine exhaust gases.	OP9	Explain principle operation of air compressors, Compound cycles, and Heat recovery boilers from turbine exhaust gases.

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

C(1.1)	Recognize the thermodynamics basic definitions, and standard international units.
C(1.2)	Recognize the thermal properties of pure substance
C(2.1)	Identify the thermal properties of pure substance at various temperature and pressures
C(2.2)	recognize the pressure and volume of ideal gas at different situation.
C(2.3)	Applying the first and second lows of thermodynamics to several application
C(2.4)	Calculate the efficiency of the gas and steam power cycle
C(2.5, 5.1)	Draw the PV & TS diagrams for various gas and steam power cycle.

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

C1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
C2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C5	Practice research techniques and methods of investigation as an inherent part of learning.

7- The relation between the course learning outcomes and the program competencies

Course (LOs)	program competencies

C(1.1)	Applying the first and second lows of thermodynamics to several application	C1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
C(1.2)	Calculate the efficiency of the gas and steam power cycle	C1	Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.
C(2.1)	Draw the PV & TS diagrams for various gas and steam power cycle.	C2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C(2.2)	Applying the first and second lows of thermodynamics to several application	C2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C(2.3)	Calculate the efficiency of the gas and steam power cycle	C2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C(2.4)	Draw the PV & TS diagrams for various gas and steam power cycle.	C2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C(2.5,5.1)	Applying the first and second lows of thermodynamics to several application	C2 C5	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions. Practice research techniques and methods of investigation as an inherent part of learning.

8- Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Working fluid, The ideal gas, The first law of thermodynamics,	2	2	0	C(1.1, 1.2)
2	Reversible processes, Irreversible processes.	2	2	0	C(1.1, 2.1)
3	The second law of thermodynamics,	2	2	0	C(2.3, 2.4)
4	Thermal cycles, Steam cycles, Entropy, fuel and combustion.	2	2	0	C(1.2, 2.2)
5	Heat transfer by conduction, Forced convection, Heat transfer by radiation, Heat exchangers.	2	2	0	C(1.2, 2.2)
6	Power generation plants, Heat cycles,	2	2	0	C(1.2, 2.2)
7	Analysis and presentation on charts for pure substances,				C(2.2)
8	Midterm		1.0		
9	Steam units, Boilers, Steam turbines, Condensers, Pumps.	2	2	0	C(1.2, 2.2)
10	Gas and combined units and operation of the gas turbine,	2	2	0	C(1.2, 2.2)
11	Air compressors,	2	2	0	C(1.2, 2.3)
12	Compound cycles,	2	2	0	C(2.5,5.1)
13	Heat recovery	2	2	0	C(2.5,5.1,2.4)
14	boilers from turbine exhaust gases	2	2	0	C(2.5,5.1)
15	Revision				C(1.1,1.2,2.1,2.2,2.3,2.4,2.5,5.1)
16	Final Exam		2.0		
Total hours		28	28	0	--

9- The Teaching and learning methods and their relation to the Los of the course

Teaching and Learning Methods

Course learning Outcomes (LOs)	On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	discovering	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
C(1.1)	✓												
C(1.2)	✓	✓											
C(2.1)	✓	✓	✓	✓	✓		✓		✓	✓			✓
C(2.2)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
C(2.3)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
C(2.4)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
C(2.5,5.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓

Notes:*The research concerns the cooperative work, the discussion and the presentations.*
The Tutorials concerns the brain storming and the problem solving.
Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

10- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	Tools of assessment: quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
C(1.1)											
C(1.2)											
C(2.1)	✓	✓	✓	✓	✓		✓		✓		✓
C(2.2)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
C(2.3)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
C(2.4)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
C(2.5,5.1)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations and Movies		weekly
Sheets and Sketches		weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		weekly

Mid-term exam		Week (٨)	
final exam		Week (١٦)	

c- Grading system

quizes	Quiz (1)	(5) marks	
	Quiz (2)	(5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	5 marks	(40) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(10) marks	
Mid-term exam		(15) marks	
final exam			(60) marks
Total			(100) marks

10- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	Holman, J. P., Thermodynamics, McGraw-Hill, New York. Streeter, Victor, L., Fluid Mechanics, 5th Edition, McGraw-Hill, New York, ISBN 07-062191-9.
c) Recommend books	Y. A. Cengel, "Thermodynamics" FIFTH EDITION, British,
d) Periodicals, Web sites, etc	No periodicals are needed.

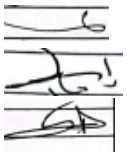
11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra examples and topic-specified research

Course coordinator:	Prof. Dr. Al-Desouki Ibrahim Saleh Eid
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023



Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course specification

Course code:	Course name
BASE 401	Communication Skills
A- Affiliation	
Relevant program:	Electrical power engineering
Department offering the program:	Electrical and communication engineering
Department offering the course:	Basic Science
Date of program operation:	2008-2009
Date of approval from the higher ministry of education	27/1/2008
Date of course operation	2022-2023

B-Basic Information

Course Name	Communication Skills
Code	BASE 401
Course Level	Fourth level courses (Senior-1) - Second semester (Spring)
Credit Hours	3Cr. Hr
Lectures	3hr
Tutorial	0hr
Total	3hr
Prerequisite	-
Instructor name/Email	Dr. Amera Marei amira.morai@sva.edu.eg

C- Professional information

1- Course core

Advanced technical communication skills, with emphasis on writing strategies for technical documents, oral presentations, and visual aids and Ethics of the engineering proficiency with emphasis on each departmental ethical and professional Licensure topics.

2- Course learning objectives:

oc 1	Recognize the meaning of communication, Its importance, and types of Communication
oc 2	declare self-concept, The concept of communication with oneself, ways of communicating with oneself and steps to communicate with oneself. focus
oc 3	used to reading attributes, reading methods, Factors affecting reading, Distractions in reading.
oc 4	Recognize the spoken verbal communication, Speaking and diction skills, and presentation skills.

oc 5	Recognize the Characteristics of nonverbal communication, The concept of non-verbal communication, Types of nonverbal communication
oc 6	Recognize the importance of discussion, styles of interlocutors, Attributes of the persuasive interviewer, and discussion skills
oc 7	able to succeed in the interview, how to write C.V, cover letter, and recommendation letter.

3- program objectives served by the course:

Upon the completion of the course the student should be able to:

OP 1	Be familiarity with the introduction to Communication
OP 2	Should know about contact with oneself
OP 3	Explain how learn reception skills
OP 4	Explain how learn transmitter skills
OP 5	Explain how learn how to use non-verbal communication
OP 6	Explain how apply discussion and persuasion skills
OP 7	Explain how learn communicate in the work environment

4- The relation between the course objectives and the program objectives

Course objectives		program objectives	
oc 1	Recognize the meaning of communication, Its importance, and types of Communication	OP 1	Be familiarity with the introduction to Communication
oc 2	declare self-concept, The concept of communication with oneself, ways of communicating with oneself and steps to communicate with oneself. focus	OP 2	Should know about contact with oneself
oc 3	used to reading attributes, reading methods, Factors affecting reading, Distractions in reading.	OP 3	Explain how learn reception skills
oc 4	Recognize the spoken verbal communication, Speaking and diction skills, and presentation skills.	OP 4	Explain how learn transmitter skills
oc 5	Recognize the Characteristics of nonverbal communication, The concept of non-verbal communication, Types of nonverbal communication	OP 5	Explain how learn how to use non-verbal communication

oc6	Recognize the importance of discussion, styles of interlocutors, Attributes of the persuasive interviewer, and discussion skills	OP 6	Explain how apply discussion and persuasion skills
oc7	able to succeed in the interview, how to write C.V, cover letter, and recommendation letter.	OP 7	Explain how learn communicate in the work environment

5- Learning outcomes of the course (LOs)

Upon the completion of the course, the student should be able to:

C(10.1)	Express using the basic skills to produce effective persuasive writing with a focus on organization, content, analysis of readings, and critical thinking. Provides training in the use and integration of sources, library, and online research.
C(10.2)	Communicate effectively with the Basics of Scientific Research, Problem Meaning, how to choose a problem, and a research plane.
C(10.3)	Express utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles
C(7.1,8.1)	Eexpress his opinion through an oral presentation and flexible model recalling the final configuration through of masses.
C(10.4)	Communicate effectively using appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C(10.5)	express his opinion through an oral presentation and a flexible model recalling the final configuration of masses.

6- Program competencies served by the course:

Upon the completion of the Program the student should be able to:

C7	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams
C8	Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools
C10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies

7- The relation between the course learning outcomes and the program competencies

Course (LOs)	program competencies

C(10.1)	Express using the basic skills to produce effective persuasive writing with a focus on organization, content, analysis of readings, and critical thinking. Provides training in the use and integration of sources, library, and online research.	C10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies
C(10.2)	Communicate effectively with the Basics of Scientific Research, Problem Meaning, how to choose a problem, and a research plane.	C10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies
C(10.3)	Express utilize contemporary technologies, codes of practice and standards, quality guidelines, health and safety requirements, environmental issues, and risk management principles	C2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective engineering judgment to draw conclusions.
C(7.1,8.1)	Eexpress his opinion through an oral presentation and flexible model recalling the final configuration through of masses. Communicate effectively using appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use statistical analyses and objective	C7 C8	Function efficiently as an individual and as a member of multi-disciplinary and multicultural teams Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools

	engineering judgment to draw conclusions.		
C(10.4)	express his opinion through an oral presentation and a flexible model recalling the final configuration of masses.	C10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies
C(10.5)	Express using the basic skills to produce effective persuasive writing with a focus on organization, content, analysis of readings, and critical thinking. Provides training in the use and integration of sources, library, and online research.	C10	Acquire and apply new knowledge; and practice self, lifelong and other learning strategies

8- Course content and the relation between the course contents and the course LOs

Week No.	Topic	Lecture hr.	Tutorial hr.	Practical hours	course LOs
1	Introduction to Communication Skills	2	2	0	C(10.1,10.2)
2	Communication with oneself	2	2	0	C(10.1,10.3)
3	Methods of communication with oneself	2	2	0	C(10.4,10.5)
4	Reception Skills	2	2	0	C(10.2,7.1, 8.1)
5	Reading Skills	2	2	0	C(10.2,7.1, 8.1)
6	Distractions in reading	2	2	0	C(10.2,7.1, 8.1)
7	Reading attributes				C(7.1,8.1)
8	Midterm		1.0		
9	Transmitter skills	2	2	0	C(10.2,7.1, 8.1)
10	Writing Skills	2	2	0	C(10.2,7.1, 8.1)
11	Non-verbal communication	2	2	0	C(10.2,10.4)
12	Discussion and persuasion skills	2	2	0	C(10.2,7.1, 8.1)
13	Distractions in discussion and persuasion skills	2	2	0	C(10.2,7.1, 8.1)

14	Communication in the work environment	2	2	0	C(10.2,7.1, 8.1)
15	Revision				C(10.2,7.1, 8.1, 10.4)
16	Final Exam		2.0		
Total hours		28	28	0	--

9- The Teaching and learning methods and their relation to the Los of the course

Course learning Outcomes (LOs)	On line / face to face lectures	Tutorials: sheets/ sketches	projects	Problem solving	Brain storming	Practical: lab	Discovering / Self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
	Teaching and Learning Methods												
C(10.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(10.2)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(10.3)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(7.1,8.1)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(10.4)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	
C(10.5)	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	

Notes:*The research concerns the cooperative work, the discussion and the presentations.*
The Tutorials concerns the brain storming and the problem solving.
Online lectures used as hybrid learning, but in case of totally on-line learning all the used teaching and learning methods will be on line.

10- Student assessment method

a- Assessment method and its relation to the Los of the course

Course ILOs	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
	Tools of assessment										
C(10.1)	✓	✓	✓	✓	✓		✓	✓	✓	✓	
C(10.2)	✓	✓	✓	✓	✓		✓	✓	✓	✓	
C(10.3)	✓	✓	✓	✓	✓		✓	✓	✓	✓	
C(7.1,8.1)	✓	✓	✓	✓	✓		✓	✓	✓	✓	
C(10.4)	✓	✓	✓	✓	✓		✓	✓	✓	✓	
C(10.5)	✓	✓	✓	✓	✓		✓	✓	✓	✓	

b- Time schedule of assessment

Quizzes	Quiz (1) Quiz (2)	Week (3) Week (10)
Discussions		Every week for any student
Presentations and Movies		weekly
Sheets and Sketches		weekly
Researches and reports		Week (2,3)
the Projects		Week (4,8)
Practical modelling		Week (4,8)
Attendance		weekly
Mid-term exam		Week (8)
final exam		Week (16)

c- Grading system

Quizzes	Quiz (1) Quiz (2)	(5) marks (5) marks	
Discussions	50%		
Sheets and Sketches	25%		
Researches and reports	25%	10 marks	(50) marks
the Projects	0%		
Practical modelling	0%		
Attendance		(10) marks	
Mid-term exam		(20) marks	
final exam			(50) marks
Total			(100) marks

10- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	Hargie, Owen, Ed. The handbook of communication skills. Psychology Press, 1997.
c) Recommend books	Crucial Conversations: Tools for Talking When Stakes Are High by Kerry Patterson, Joseph Grenny, Ron McMillan, and Al Switzler. Communication Skills Training: A Practical Guide to Improving Your Social Intelligence, Presentation, Persuasion, and Public Speaking by Ian Tuhovsky.
d) Periodicals, Web sites, etc	No periodicals are needed.

11- Facilities required for teaching and learning:

- Appropriate teaching design studios including presentation board, data show
- Google classroom
- E- learning

12- Requirements for Disable facilities:

- On line teaching hours if it is needed
  Extra amples and topic-specified research

Ministry of higher education
High valley institute for engineering and technology
Electrical power engineering program

Course coordinator:	Dr. Amera Marei
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2022/2023