Fifth level courses (Senior -2)

First semester (Fall)

No.	Cod	Course Name	Instructor
1	CECE 436	Electrical Machines III	Ass. Prof. Dr. Shady Abdel Aleem
2	CECE 489	Professional Training	Dr. Salem Abdel Aziz Fikri Ahmed Sheikh
3	CECE 323	Power System Analysis II	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
4	CECE 439	Protection & Switchgear in Electrical Power	Dr. Salem Abdel Aziz Fikri Ahmed Sheikh & Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
5	BASE 494	High Voltage Engineering	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
6	BASE 496	High Voltage Engineering Lab	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
7	CECE 490	Senior project I	Ass. Prof. Dr. Shady Abdel Aleem & Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
8	BASE 307	Contracts, Bids & Liabilities	Dr. Ashraf Abd El-Khalik
9	BASE 308	Seminar	Dr. Ahmed Refaat

Course specification

Course code:	Course name
CECE 436	Electric Machine III
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	2023-2024

B-Basic Information

Title	Electric Machine III
Code	CECE 436
level courses	Fifth level courses (Senior -2)- First semester (Fall)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Lab	2hr
Total	6hr
Prerequisite	CECE 318
Instructor name/Email	Dr. Sabah Ibrahim Muhammad

C- Professional information

1- Course core

Synchronous machines : Theory and design : Introduction, Cylindrical-rotor and salient-pole synchronous machines, Types of windings in ac machines, Winding coefficients, Generator performance, Motor performance, Phasor diagrams in three-phase synchronous machines, Synchronous impedance steady state operation, Voltage regulation, Parallel operation, Synchronous machine to an infinite bus, The synchronization process, The V curves, power angle characteristics, The two-reaction theory, Open circuit characteristics, Short circuit characteristics, Potier reactance, Zero-power-factor characteristic, Damper bars, Testing of synchronous machines, Construction, Design, Main dimensions, Examples on the design of turbo-generators and low speed generators.

2- Course learning objectives:

oc 1	Explain the principle of synchronous machines, Theory and design, Cylindrical-rotor and salient-pole synchronous machines, Types of windings in ac machines, Winding coefficients, Generator performance,

	Motor performance, Phasor diagrams in three-phase synchronous machines.
oc 2	Recognize the synchronous impedance steady state operation, Voltage regulation, Parallel operation, Synchronous machine to an infinite bus.
oc 3	Able to understand with the synchronization process, The V curves, power angle characteristics, The two-reaction theory, Open circuit characteristics, Short circuit characteristics, Potier reactance, Zero-power-factor characteristic, Damper bars.
oc 4	Able to understand testing of synchronous machines, Construction, design, main dimensions, examples on the design of turbo-generators and low speed generators.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

Lo1	Identifies the basics of synchronous machines, Theory and design, Cylindrical-rotor and salient-pole synchronous machines, Types of windings in ac machines, Winding coefficients, Generator performance, Motor performance, Phasor diagrams in three-phase synchronous machines.

b- Psychomotor Domains (LOs):

Lo2	Apply knowledge about synchronous impedance steady state operation, Voltage regulation, Parallel operation, Synchronous machine to an infinite bus.
Lo3	Prepare and present the Phasor diagrams in three-phase synchronous machines and obtain its parameters.
Lo4	Utilize the synchronization process, The V curves, power angle characteristics, The two-reaction theory, Open circuit characteristics, Short circuit characteristics, Potier reactance, Zero-power-factor characteristic, Damper bars.

c- Affective Domains (LOs):

Lo5	Express the main dimensions, solve examples on the design of turbogenerators and low speed generators, do testing of synchronous machines and obtain its parameters.

4- Program LOs served by the course:

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

Lo13	Explain the basic electrical power system theory.

Lo14	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
Lo15	Explain the diverse applications of electrical power equipment.
Lo9	Identify the standard Software Engineering practices and strategies in real-time software project development using an open-source programming environment or commercial environment to deliver quality products for the organization's success
Lo29	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
Lo39	Show accuracy while Designing experiments
Lo40	Apply modern techniques
Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

5- The relation between the course learning outcomes and the program LOs

Course (LOs)		program LOs	
Lo1	Identifies the basics of synchronous machines, Theory and design, Cylindrical-rotor and salient-pole synchronous machines, Types of windings in ac machines, Winding coefficients, Generator performance, Motor performance, Phasor diagrams in three-phase synchronous machines. Apply knowledge about synchronous impedance steady state operation, Voltage regulation, Parallel operation, Synchronous machine to an infinite bus.	Lo13	Explain the basic electrical power system theory.
		Lo14	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
		Lo15	Explain the diverse applications of electrical power equipment.
Lo2	Prepare and present the Phasor diagrams in three-phase synchronous machines and	Lo9	Identify the standard Software Engineering practices and strategies in real-time software project development

	obtain its parameters.		using an open-source programming environment or commercial environment to deliver quality products for the organization's success
Lo3	Utilize the synchronization process, The V curves, power angle characteristics, The two-reaction theory, Open circuit characteristics, Short circuit characteristics, Potier reactance, Zero-power-factor characteristic, Damper bars.	Lo29	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
Lo4	Express the main dimensions, solve examples on the design of turbo-generators and low speed generators, do testing of synchronous machines and obtain its parameters.	Lo29	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
Lo5	Identifies the basics of synchronous machines, Theory and design, Cylindrical-rotor and salient-pole synchronous machines, Types of windings in ac machines, Winding coefficients, Generator performance, Motor performance, Phasor diagrams in three-phase synchronous machines.	Lo39	Show accuracy while Designing experiments
		Lo40	Apply modern techniques
		Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

6- 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	2	LO1
2	Focuses on Asynchronous	2	2	2	LO 1

	(Induction) Machines.				
3	Focuses on Asynchronous (Induction) Machines + Principle of operation.	2	2	2	LO 1
4	Quiz (1) +Focuses on Power and Torque and Phasor diagram of a synchronous generator and solved examples.	2	2	2	LO 2
5	Focuses on measurement of model parameters and Open-circuit characteristic (OCC), Short-Circuit Characteristics (SCC).	2	2	2	LO 3
6	Focuses on synchronous generators measurement of model parameters.	2	2	2	LO 3
7	The Synchronous Generator Operating Alone –Variable Loads.	2	2	2	LO 3
8	Midterm		1.0		
9	Focuses on active and reactive power angle characteristics	2	2	2	LO 4
10	Capability Curve of a Synchronous Generator.	2	2	2	LO 4
11	Focuses on Terminal characteristics of synchronous generators and solved examples.	2	2	2	LO 5
12	Quiz (2) + Basic Principle of Synchronous Motor.	2	2	2	LO 5
13	Focuses on Equivalent Circuit of a Synchronous Motor	2	2	2	LO 4
14	Focuses on Solved examples on load chan.	2	2	2	LO 3
15	Focuses on Applications of Synchronous Motors.	2	2	2	LO 5
16	Final Exam		2.0		
Total hours		28	28	28	--

7- 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 / self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
Lo1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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.

8- 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	
Lo1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)

	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations		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	▪ Ion Boldea, Syed A. Nasar," The Induction Machine Handbook," CRC Press ,Boca Raton London New York Washington, D.C. ▪ P.C.SEN, "PRINCIPLES OF ELECTRIC MACHINES AND POWER ELECTRONICS, "John Wiley & Sons. ▪ TURAN GÖNEN," ELECTRICAL MACHINES WITH MATLAB,"CRC Press, Taylor& Francis Group.
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 assignments

Course coordinator:	Dr. Sabah Ibrahim Muhammad
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2023/2024

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

Course specification

Course code:	Course name
CECE 489	Professional Training
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	2023-2024

B-Basic Information

Title	Professional Training
Code	CECE 489
level courses	Fifth level courses (Senior -2)-First semester (Fall)
Credit Hours	1Cr. Hrs.
Lectures	0Hrs.
Lab	3 Hrs.
Total	3Hrs.
Prerequisite	Senior Standing
Instructor name/Email	Dr. Salem Abdel Aziz Fikri Ahmed Sheikh salem. abdelaziz @sva.edu.eg

C- Professional information

1- Course core

Each student is required to spend a minimum of eight weeks in some related concentration field. A report followed by discussion is submitted to a departmental committee for evaluation.

2- Course learning objectives:

oc 1	Able to understand solar Systems Classifications and Applications, Solar Radiation, and Solar PV Fundamentals.
oc 2	Explain the principle of Stand-alone system Components, Solar pumping system Components.
oc 3	Explain how to deduce sizing and design of Solar PV standalone system, Solar pumping sizing and design.
oc 4	Explain the principle of the off-grid Systems Installation, testing and commissioning, Off-grid systems maintenance, System Feasibility, and stand-

	alone system and solar pumping.

3- Learning outcomes of the course (LOs)

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

a- Cognitive Domains (LOs):

LO1	Identifies the basics about sizing and design of Solar PV standalone system.
LO2	Recognize the solar pumping system Components, Solar pumping sizing and design

b- Psychomotor Domains (LOs):

-	None

c- Affective Domains (LOs):

LO3	Apply knowledge to off-grid Systems installation, testing and commissioning.
LO4	Express the off-grid systems maintenance, System Feasibility, and stand-alone system and solar pumping

4- Program LOs served by the course:

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

Lo13.	Explain the basic electrical power system theory.
Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
Lo15.	Explain the diverse applications of electrical power equipment.
Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
Lo17.	define the Basics of low voltage power systems.
Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
Lo40.	Apply modern techniques
Lo41.	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

5- The relation between the course learning outcomes and the program LOs

Course (LOs)		Program LOs	
LO1	Identifies the basics about	Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in

	sizing and design of Solar PV standalone system.		the projects.
		Lo15.	Explain the diverse applications of electrical power equipment.
		Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
LO2	Recognize the solar pumping system Components, Solar pumping sizing and design	Lo13.	Explain the basic electrical power system theory.
		Lo17.	define the Basics of low voltage power systems.
		Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
LO3	Explain the heighten awareness of the off-grid Systems installation, testing and commissioning.	Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
LO4	Express the off-grid systems maintenance, System Feasibility, and stand-alone system and solar pumping	Lo40	Apply modern techniques
		Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

1- 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	Explain how the training report is fulfillment.	0	0	0	LO4
2	Solar Systems Classifications and Applications	0	0	0	LO1
3	Solar Radiation	0	0	0	LO1
4	Solar PV Fundamentals	0	0	0	LO1
5	Stand-alone system Components	0	0	0	LO1
6	Sizing and design of Solar PV standalone system	0	0	0	LO1
7	Sizing and design of Solar PV standalone system	0	0	0	LO1
8	Solar pumping system Components		0		0

9	Solar pumping sizing and design	0	0	0	LO2
10	Solar pumping sizing and design	0	0	0	LO2
11	Off-grid Systems Installation, testing and commissioning	0	0	0	LO3
12	stand-alone system and solar pumping, Final Test	0	0	0	LO3
13	Feedback and submit report.	0	0	0	LO4
14	Semifinal feedback and submit report.	0	0	0	LO4
15	Final feedback and semifinal report.	0	0	0	LO4
16	Final Report.		0.0		
Total hours		0	0	0	--

2- 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 / self	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
Lo1								✓	✓		✓	✓	
Lo2								✓	✓		✓	✓	
Lo3								✓	✓		✓	✓	
Lo4								✓	✓		✓	✓	

Notes:
The research concerns the discussion, the site visit and the presentations.

3- 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	Modeling
Lo1			✓					✓	✓	✓	
Lo2			✓					✓	✓	✓	
Lo3			✓					✓	✓	✓	
Lo4			✓					✓	✓	✓	
Lo5			✓					✓	✓	✓	

b- Time schedule of assessment

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

c- Grading system

Final Report	(10) marks
Final Discussion	(50) marks
Training organization assessment	(40) marks
Total	(100) marks

10- List of references:

a) Course notes	Student have to take written note based on the instructor's lecture Submission must be a periodical technical presentation. Final submission is A4 paper. The student has to report his own work through the current academic course. Printing and electronic versions of the report are

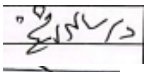
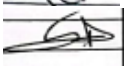
	required. The discussion and students' participants are very essential. The evaluations are internal periodical assessments. Student grades are available and posted in the class.
b) Required books	1. "Solar Photovoltaic Technology: Basics, Design, and Applications" by Chetan Singh Solanki 2. "Photovoltaic Systems Engineering" by Roger A. Messenger and Amir Abtahi 3. "Handbook of Photovoltaic Science and Engineering" edited by Antonio Luque and Steven Hegedus 4. "Solar Electric Handbook: Photovoltaic Fundamentals and Applications" by Michael Boxwell 5. "Renewable Energy Systems: Design and Analysis with Induction Generators" by Mukhtar Ahmad 6. H.S. Rauschenbach, Solar Cell Array Design Handbook., NewYork: Va Nostrand Reinhold, 1980. 7. A.L.F.a.R.H.Bube, "Fundamentals Of Solar Cells", San Francisco, C Academic, 1983. 8. J.A.a.S.A.C. Carrero, "A single procedure for helping PV designers select silicon PV module and evaluate the loss resistances", Renewable Energy, 2007. 9. R.T.a.P.R.D.Sera, "PV panel model based on datasheet values", P IEEE Int. Symp. Ind.Electron.(ISIE),2007.
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 assignments

Course coordinator:	Dr. Salem Abdel Aziz Fikri Ahmed Sheikh	
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul	
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem	
Date:	2023/2024	

Course code:	Course name
CECE 323	Power system analysis 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	2023-2024

B-Basic Information

Title	Power system analysis II
Code	CECE 323
level courses	Fifth level courses (Senior -2)-First semester (Fall)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Lab	2hr
Total	6hr
Prerequisite	CECE 322
Instructor name/Email	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul ihab.nabil@sva.edu.eg

C- Professional information

1- Course core

Transients in electrical systems: Types of transients, Equivalent circuits of power system elements, Multi-machine linear systems, Maximum power and loading limit, Modeling of basic elements of electrical systems: Vector diagram representation, Simplified systems, Excitation and speed control systems, Block diagram representation, Simplified criteria of transient stability : Concept of transient stability, Equal area criterion, Numerical solutions of rotor electromechanical equation, Dynamic stability: Analysis of uncontrolled systems, Controlled systems, Power system stabilizers, Voltage stability of loads and power systems: Criteria of voltage stability, Voltage collapse in electrical power.

2- Course learning objectives:

oc 1	Explain the principle about per unit system and power system stability and dynamics.
oc 2	Able to understand how analyze power system voltage stability problems.
oc 3	Able to understand how analyze power system angle stability problems for both

	small and large disturbances.
oc 4	Explain how to analyze load frequency control problems.

3- Learning outcomes of the course (LOs)

a- Cognitive Domains (LOs):

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

Lo1	Differentiate between types of power system stability, State the swing equation in electrical units and per-unit forms.
Lo2	Demonstrate understanding of the equal area criterion, Model the power system components for small signal study.
Lo3	Evaluate the synchronizing power and Damping coefficients, Derive the maximum power equation under a given power factor.
Lo4	Demonstrate the equations of PV and VQ curves, Develop the power angle equation before, during and after fault.

b- Psychomotor Domains (LOs):

Lo5	Utilize the system transient stability using equal area criterion, Analyze the small signal stability of a single-machine infinite bus system.
Lo6	Apply knowledge to analyze the voltage stability using PV curve, Use VQ curve to select suitable size of shunt capacitors for voltage stability requirements.
Lo7	Conduct and develop suitable numerical methods to solve the swing equation, Analyze and solve load frequency control problems.
Lo8	Apply knowledge about Power World Simulator to analyze voltage stability problem.

c- Affective Domains (LOs):

-	None

4- Program LOs served by the course:

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

Lo13.	Explain the basic electrical power system theory.
Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
Lo15.	Explain the diverse applications of electrical power equipment.
Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
Lo17.	Define the Basics of low voltage power systems.

Lo18.	Identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components
Lo30.	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.

5- The relation between the course learning outcomes and the program LOs

	Course (LOs)	program LOs	
Lo1	Differentiate between types of power system stability, State the swing equation in electrical units and per-unit forms.	Lo13.	Explain the basic electrical power system theory.
		Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo2	Demonstrate understanding of the equal area criterion, Model the power system components for small signal study.	Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
Lo3	Evaluate the synchronizing power and Damping coefficients, Derive the maximum power equation under a given power factor.	Lo15.	Explain the diverse applications of electrical power equipment.
		Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
Lo4	Demonstrate the equations of PV and VQ curves, Develop the power angle equation before, during and after fault.	Lo17.	define the Basics of low voltage power systems.
		Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.

Lo5	Utilize the system transient stability using equal area criterion, Analyze the small signal stability of a single-machine infinite bus system.	Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
Lo6	Apply knowledge to analyze the voltage stability using PV curve, Use VQ curve to select suitable size of shunt capacitors for voltage stability requirements.	Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components
Lo7	Conduct and develop suitable numerical methods to solve the swing equation, Analyze and solve load frequency control problems.	Lo30.	. Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
Lo8	Apply knowledge about Power World Simulator to analyze voltage stability problem.	Lo30.	. Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.

6- 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: Per unit system and Power System Stability.	2	2	2	Lo1
2	Power System Model for Stability: swing equation	2	2	2	Lo2
3	Power-angle characteristics, Vector diagrams.	2	2	2	Lo2
4	Small Signal Stability of unregulated systems.	2	2	2	Lo3
5	Small Signal Stability of regulated systems.	2	2	2	Lo4
6	Transient Stability, Equal Area Criterion+	2	2	2	Lo5

	Quiz (1).				
7	Examples on Equal Area Criterion.	2	2	2	Lo5
8	Midterm		1.0		
9	Numerical solution of swing equation.	2	2	2	Lo6, Lo8
10	Maximum Deliverable power for 2-node system.	2	2	2	Lo6
11	PV curve and voltage stability.	2	2	2	Lo6
12	VQ curve and shunt compensation +Quiz (2).	2	2	2	Lo5
13	Droop Characteristic of Synchronous Generators, load frequency control, control of generation overview	2	2	2	Lo7
14	Power Generation Station Components	2	2	2	Lo7
15	Parallel generators sharing active power of load, Load Increase and System Frequency	2	2	2	Lo7
16	Final Exam		2.0		
Total hours		28	28	28	--

7- 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												
Lo1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo7	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo8	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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.

8- 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
Lo1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations		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%		(40) marks
Researches and reports	20%	5 marks	
the Projects	30%		
Practical modelling	20%		

Attendance	(10) marks
Mid-term exam	(15) marks
final exam	(60) marks
Total	(100) marks

9- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	Hadi Saadat, “Power System Analysis”, PSA Publishing, Third Edition, 2010.
c) Recommend books	Thierry Van Cutsem, Costas Vournas, “Voltage Stability of Electric Power System", Springer, 1998.
d) Periodicals, Web sites, etc	No periodicals are needed.

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 assignment

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:	2023/2024	

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

Course specification

Course code:	Course name
CECE 439	Protection & Switchgear in Electrical Power
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	2023-2024

B-Basic Information

Title	Protection & Switchgear in Electrical Power
Code	CECE 439
level courses	Fifth level courses (Senior -2)-First semester (Fall)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Total	4hr
Prerequisite	CECE 322
Instructor name/Email	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul ihab.nabil@sva.edu.eg

C- Professional information

1- Course core

Protection relaying philosophy and fundamental considerations, Transmission line protection, Short lines, Medium length lines, Long distance power transmission, Compensating distance relaying. Rotating machinery protection: Relay protection for ac generators, Loss of field relay operation, Power transformer protection, Relay input sources, Switchgear engineering: Circuit breakers, Types, Construction, Performance and ratings, Interruption of fault currents and arcs in circuit breakers, Circuit breaker test oscillograms, Circuit breakers synthetic and direct tests. Switching over-voltages, Resistance switching, Capacitance switching

2- Course learning objectives:

oc 1	Recognize the circuit breakers, Types, Construction, Performance and ratings, Interruption of fault currents and arcs in circuit breakers, Circuit breaker test oscillograms, Circuit breakers synthetic and direct tests.
oc 2	Explain the principle of switching over-voltages, resistance switching,

	Capacitance switching.
oc 3	Able to understand the protection of different power system components, security, dependability, reliability, current transformers.
oc 4	Able to understand concept of over-current relay and coordination between other relays, coordination between two circuit breakers, coordination between two fuses, coordination between over-current relay and fuse, earth relay and coordination between other relays.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

LO1	Differentiate between types of circuit breakers, Construction, Performance, and ratings.
LO2	Demonstrate the Interruption of fault currents and arcs in circuit breakers, Circuit breaker test oscillograms
LO3	Evaluate the circuit breaker test oscillograms, Circuit breakers synthetic and direct tests.
LO4	Analysis the switching over-voltages, Resistance switching, Capacitance switching.
LO5	Identifies the basic of the protection of different power system components, security, dependability, reliability, current transformers

b. Psychomotor Domains (LOs):

LO6	Apply knowledge to the protection of different power system components, security, dependability, reliability, current transformers

b. Affective Domains (LOs):

LO7	Communicate effectively with over-current relay and coordination between other relays, coordination between two circuit breakers, coordination between two fuses, coordination between overcurrent relay and fuse.

4- Program LOs served by the course:

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

Lo13.	Explain the basic electrical power system theory.
Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.

Lo15.	Explain the diverse applications of electrical power equipment.
Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
Lo17.	define the Basics of low voltage power systems.
Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.
Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering
Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

5- The relation between the course learning outcomes and the program LOs

Course (LOs)		program LOs	
LO1	Differentiate between types of circuit breakers, Construction, Performance, and ratings.	Lo13.	Explain the basic electrical power system theory.
LO2	Demonstrate the Interruption of fault currents and arcs in circuit breakers, Circuit breaker test oscillograms	Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.

LO3	Evaluate the circuit breaker test oscillograms, Circuit breakers synthetic and direct tests.	Lo15.	Explain the diverse applications of electrical power equipment.
LO4	Analysis the switching over-voltages, Resistance switching, Capacitance switching.	Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
LO5	Identifies the basic of the protection of different power system components, security, dependability, reliability, current transformers	Lo17.	define the Basics of low voltage power systems.
LO6	Apply knowledge to the protection of different power system components, security, dependability, reliability, current transformers	Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
		Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.
LO7	Communicate effectively with over-current relay and coordination between other relays, coordination between two circuit breakers, coordination between two fuses, coordination between overcurrent relay and fuse.	Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
		Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering

	Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

6- 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 for power Circuit Breakers (CBs)	2	2	0	Lo1
2	Bulk oil (CBs), Minimum oil (CBs), Air (CBs), SF6(CBs)	2	2	0	Lo1
3	Arcing duration in (CBs), Arc length, problem of arcing duration in (CBs), fault clearing time.	2	2	0	Lo2
4	Time characteristics of (CBs), long time delay, short time delay, instantaneous, example of adjusting (CBs).	2	2	0	Lo3
5	(CBs) performance, short circuit calculations, the switching over-voltages, Resistance switching, Capacitance switching.	2	2	0	Lo4
6	Growth of current when purely inductive circuit to a sinusoidal supply, Growth of current when resistance and inductive are connected series to a sinusoidal supply +Quiz (1).	2	2	0	Lo4
7	Interpretation of CBs test oscillogram.	2	2	0	Lo4
8	Midterm		1.0		
9	Introduction of the protection of different power system components, security, dependability, reliability.	2	2	0	Lo5
10	current transformers	2	2	0	Lo5
11	Explain the basis of overcurrent	2	2	0	Lo6

	relay				
12	Protective coordination between the relays,	2	2	0	Lo6
13	coordination between two circuit breakers, coordination between two fuses, coordination between overcurrent relay and fuse +Quiz (2).	2	2	0	Lo6
14	Explain the basis of earth relay	2	2	0	Lo6
15	Protective coordination between the relays,				Lo7
16	Final Exam		2.0		
Total hours		28	28	0	--

7- 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	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
Lo1	✓												
Lo2	✓	✓											
Lo3	✓	✓	✓	✓	✓		✓		✓	✓			✓
Lo4	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓

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.

8- 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
Lo1											
Lo2											
Lo3	✓	✓	✓	✓	✓		✓		✓		✓
Lo4	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations		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	(40) marks
	Quiz (2)	(5) marks	
Discussions	15%		
Sheets and Sketches	20%		
Researches and reports	20%	5 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	Sunil S. Rao, "Switchgear, Protection and Power Systems", Khanna Publishers, Thirteenth Edition, 2008.
c) Recommend books	Horwitz, S. H. and Phadke, A. G., "Power System Relaying", John Wiley, 1992.
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 assignments

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:	2023/2024

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

Course specification

Course code:	Course name
CECE 494	High Voltage Engineering
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	2023-2024

B-Basic Information

Title	High Voltage Engineering
Code	CECE 494
level courses	Fifth level courses (Senior -2)- First semester (Fall)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Total	4hr
Prerequisite	CECE 323
Instructor name/Email	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul ihab.nabil@sva.edu.eg

C- Professional information

1- Course core

Advantages and limitations of using high voltages for transmission, Generation, and measurement of high voltage for testing, Generation of impulse waves, The impulse generators.

2- Course learning objectives:

oc 1	Recognize the the basis of high voltage generation, measurement and testing.
oc 2	Explain the principle of the electrical breakdown theories in different insulators (gases, liquids, & solids)
oc 3	Able to understand the different types of insulators in overhead transmission line.
oc 4	Explain how to measure, construct and examine the high voltage cables and insulators under controlled guidance and supervision while

	gaining the experience through application and analysis of realistic power system protection problem.
oc 5	Recognize how apply basis of High voltage cables, Earthling systems, Neutral Grounding, Earth resistivity measurement, Overvoltage on power systems.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

Lo1	Differentiate between the normal, extra, and ultra-high voltage signals, describe the high voltage generation, measurement, and testing procedures.
Lo2	Demonstrate the different types of insulators and their applications (Gas, Liquid, and Solids), Summarizes the electrical breakdown theories in different insulators (gases, liquids, & solids).
Lo3	Analysis the electric field and construction of high voltage cables.

b. Psychomotor Domains (LOs):

Lo4	Apply knowledge to propose the suitable earthing schemes for specific application, Evaluate the breakdown voltage for different insulating material.
Lo5	produce the capability of performing the different high voltage tests at the High Voltage Laboratory, Practice the different precautions of the high voltage laboratory.
Lo6	Apply knowledge to the proper earthing systems& grounding schemes, Neutral Grounding schemes, Earth resistivity measurement.
Lo7	Utilize the basis of High voltage cables.
Lo8	Conduct and develop the Overvoltage on power systems

c. Affective Domains (LOs):

-	None

4- Program LOs served by the course:

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

Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
Lo15.	Explain the diverse applications of electrical power equipment.
Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.

Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
Lo30.	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.

5- The relation between the course learning outcomes and the program LOs

	Course (LOs)	program LOs	
LO1	Differentiate between the normal, extra, and ultra-high voltage signals, describe the high voltage generation, measurement, and testing procedures.	Lo14.	Analyze the performance of electric power generation, control, and distribution systems.
LO2	Demonstrate the different types of insulators and their applications (Gas, Liquid, and Solids), Summarizes the electrical breakdown theories in different insulators (gases, liquids, & solids).	Lo15.	Analyze the performance of electric power generation, control, and distribution systems.
LO3	Analysis the electric field and construction of high voltage cables.	Lo16.	Analyze the performance of electric power generation, control, and distribution systems.
LO4	Apply knowledge to propose the suitable earthling schemes for specific application, Evaluate the breakdown voltage for different insulating material.	Lo19.	Analyze the performance of electric power generation, control, and distribution systems.
LO5	produce the capability of performing the different high voltage tests at the High Voltage Laboratory, Practice the different precautions of the high voltage laboratory.	Lo30.	Analyze the performance of electric power generation, control, and distribution systems.

LO6	Apply knowledge to the proper earthling systems& grounding schemes, Neutral Grounding schemes, Earth resistivity measurement.	Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
		Lo30.	. Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
LO7	Utilize the basis of High voltage cables.	Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
LO8	Conduct and develop the Overvoltage on power systems	Lo30.	. Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.

6- 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 for Generation of AC voltage at Power Frequency.	2	2	0	LO1
2	H.V Generation of AC voltage at high Frequency& Problem., H.V Generation of impulse Generator& Problem.	2	2	0	LO1
3	Sphere ap measures peak voltage, Gas discharge in Gas	2	2	0	LO2
4	Generation of H.V DC& Problem.	2	2	0	LO2
5	Resistance, capacitance potential	2	2	0	LO2

	divider &Problem.				
6	Theory of breakdown in gas, oil& Problem +Quiz (1).	2	2	0	LO2
7	Resistance of single core cable +multi core cable& Problem.	2	2	0	LO3,LO7
8	Midterm		1.0		
9	H.V Corona Discharge Gas in Transmission Line	2	2	0	LO4,LO5
10	Grounding System, Hemi Sphere Grounding, Rod of Grounding.	2	2	0	LO5
11	Earthing systems.	2	2	0	LO4
12	Neutral Grounding.	2	2	0	LO4
13	Earth resistivity measurement +Quiz (2).	2	2	0	LO4
14	Overvoltage on power systems.	2	2	0	LO8
15	Overvoltage on power systems.	2	2	0	LO8
16	Final Exam		2.0		
Total hours		28	28	0	--

7- 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
Lo1	✓												
Lo2	✓	✓											
Lo3	✓	✓	✓	✓	✓		✓		✓	✓			✓
Lo4	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
Lo7	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓
Lo8	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓

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.

8- 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
Lo1											
Lo2											
Lo3	✓	✓	✓	✓	✓		✓		✓		✓
Lo4	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo7	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo8	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations		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 (7)
final exam		Week (14)

c- Grading system

quizes	Quiz (1)	(5) marks	
	Quiz (2)	(5) marks	
Discussions	15%		(40) marks
Sheets and Sketches	20%	5 marks	
Researches and reports	20%		

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-S Naidu, "High Voltage Engineering",Tata Mc Graw Hill Co., 1982. ▪ E. Kuffel , W. S. Zaengl, J. Kuffel, High ▪ Voltage Engineering, 2nd edition, Newnes ▪ Press, 2000.
c) Recommend books	Abdel Salam, M., Anis, H., El-Morshedy, A., and Radwan, R., "High Voltage Engineering", Marcel Dekker Inc., 2000. M. Khalifa, High Voltage Engineering, Marcel Dekker, Inc.
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 assignments

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:	2023/2024

Course specification

Course code:	Course name
CECE 496	High Voltage Engineering Lab
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	2023-2024

B-Basic Information

Title	High Voltage Engineering Lab
Code	CECE 496
level courses	Fifth level courses (Senior -2)-First semester (Fall)
Credit Hours	1 Cr. hr
Lectures	0hr
lab	3hr
Total	3hr
Prerequisite	Conc. with CECE 494
Instructor name/Email	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul ihab.nabil@sva.edu.eg

C- Professional information

1- Course core

Insulators for transmission lines and substations, Insulator materials: Shapes and types, Factors affecting performance of insulators, Testing of insulators: Destructive and non-destructive insulation tests- electrical breakdown in gases, Ionization and attachment coefficients, Electro-negative gases, Electrical breakdown in liquids and solids. Corona discharge, Single and three-core cables, Electrical stresses in cables, High voltage equivalent circuits, High voltage cables, Thermal properties of cables, Earthing systems

2- Course learning objectives:

oc 1	Explain how to measure the breakdown voltage in air in uniform field (plate to plate) under the DC and AC voltages

oc 2	Able to understand the influence of the factors affecting the breakdown voltage in air.
oc 3	Explain how to demonstrate the surface breakdown voltage (in air) of a solid insulator in the presence of uniform field (two parallel plates) under the DC and AC voltages.
oc 4	Utilize the influence of the factors affecting the breakdown voltage.
oc5	Recognize how be able to measure and test the dielectric strength of a sample of a commercial oil (using an oil tester). Such oil is used in some electrical apparatus such as power transformer and circuit breakers.

3- Learning outcomes of the course (LOs)

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

a- Cognitive Domains (LOs):

-	None

b- Psychomotor Domains (LOs):

-	None

c- Affective Domains (LOs):

LO1	Communicate effectively with the breakdown voltage in uniform field is higher than the non-uniform field
LO2	Explain the heighten awareness of non-uniform field the corona is initiated firstly and then the breakdown occurs
LO3	Explain the heighten awareness of uniform field the breakdown occurs without proceeding corona
LO4	Communicate effectively with the breakdown voltage increases with increasing gap distance.
LO5	Express the breakdown voltage with solid specimen is higher than the breakdown value without the solid specimen
LO6	Express his opinion about the possible factors that affecting the breakdown voltage.

4- Program LOs served by the course:

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

Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering
Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power

Engineering with Internet of Things

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

	Course (LOs)	program competencies	
LO1	Communicate effectively with the breakdown voltage in uniform field is higher than the non-uniform field	Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
LO2	Explain the heighten awareness of non-uniform field the corona is initiated firstly and then the breakdown occurs	Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering
LO3	Explain the heighten awareness of uniform field the breakdown occurs without proceeding corona	Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things
LO4	Communicate effectively with the breakdown voltage increases with increasing gap distance.	Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
LO5	Express the breakdown voltage with solid specimen is higher than the breakdown value without the solid specimen	Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering
LO6	Express his opinion about the possible factors that affecting the breakdown voltage.	Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

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

Week	Topic	Lect	Tutori	Practi	course LOs

No.		ure hr.	al hr.	cal hours	
1	Breakdown of Gases Insulating Materials (Air)	-	-	3	LO1, LO2
2	Breakdown of Gases Insulating Materials (Air)	-	-	3	LO1, LO2
3	Breakdown of Gases Insulating Materials (Air)	-	-	3	LO1, LO2
4	Breakdown of Gases Insulating Materials (Air)	-	-	3	LO1, LO2
5	Breakdown of Gases Insulating Materials (Air)	-	-	3	LO1, LO2
6	Breakdown of Solid Insulating Material	-	-	3	LO3, LO4
7	Breakdown of Solid Insulating Material	-	-	3	LO3, LO4
8	Midterm		1.0		
9	Breakdown of Solid Insulating Material	-	-	3	LO3, LO4
10	Breakdown of Solid Insulating Material	-	-	3	LO3, LO4
11	Breakdown of Liquid Insulating Material.	-	-	3	LO5, LO6
12	Breakdown of Liquid Insulating Material	-	-	3	LO5, LO6
13	Breakdown of Liquid Insulating Material	-	-	3	LO5, LO6
14	Breakdown of Liquid Insulating Material	-	-	3	LO5, LO6
15	Breakdown of Liquid Insulating Material	-	-	3	LO5, LO6
16	Final Exam		2.0		
Total hours		-	-	42	--

7- 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
Lo1	✓	✓	✓			✓	✓			✓	✓	✓	
Lo2	✓	✓	✓			✓	✓			✓	✓	✓	
Lo3	✓	✓	✓			✓	✓			✓	✓	✓	
Lo4	✓	✓	✓			✓	✓			✓	✓	✓	
Lo5	✓	✓	✓			✓	✓			✓	✓	✓	

Notes:

The research concerns the cooperative work, the discussion and the presentations.
The Tutorials concerns on sheets.
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.

8- Student assessment method

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

Course lLOs	Tools of assessment										
	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
Lo1		✓	✓	✓	✓	✓	✓	✓		✓	
Lo2		✓	✓	✓	✓	✓	✓	✓		✓	
Lo3		✓	✓	✓	✓	✓	✓	✓		✓	
Lo4		✓	✓	✓	✓	✓	✓	✓		✓	
Lo5		✓	✓	✓	✓	✓	✓	✓		✓	

b- Time schedule of assessment

Discussions	Every week for any student
Presentations	weekly
Sheets and Sketches	weekly
the Projects	weekly
Attendance	weekly
Mid-term exam	Week (8)
final exam	Week (16)

c- Grading system

Discussions	20%		
Sheets and Sketches	70%	40 marks	
Researches and reports	0%		
the Projects	10%		
Attendance		(10) marks	
Mid-term exam		(10) marks	
final exam			(40) marks
Total			(100) marks

10- List of references:

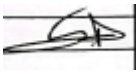
a)	Course notes	Lecture notes and handouts
b)	Required books	▪ M-S Naidu, “High Voltage Engineering”,Tata Mc Graw Hill Co., 1982. ▪ E. Kuffel , W. S. Zaengl, J. Kuffel, High Voltage Engineering, 2nd edition, Newnes Press, 2000.
c)	Recommend books	▪ Abdel Salam, M., Anis, H., El-Morshedy, A., ▪ and Radwan, R., "High Voltage Engineering", Marcel Dekker Inc., 2000. ▪ M. Khalifa, High Voltage Engineering, Marcel Dekker, ▪ Inc.
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 assignments

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:	2023/2024	

Course specification

Course code:	Course name
CECE 490	Senior Project 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	2023-2024

B-Basic Information

Title	Senior Project I
Code	CECE 490
Credit Hours	1Cr. hr
Lectures	1hr
Tutorial	0hr
Lab	0hr
Total	1hr
Prerequisite	Senior Standing
Instructor name/Email	Dr. Abdallah Reda El-Sayed Eissa Abdallah. Reda @sva.edu.eg

C- Professional information

Participating students select project topic according to their subject of interest and the availability of facilities and advisors. Students carry out necessary preliminary work and submit a progress report. Ethical responsibilities of a computing professional are covered by lectures and seminars and emphasized through the student's team work

1- Course learning objectives:	
oc 1	Recognize how apply knowledge on power system and to provide them with in depth knowledge of the distribution system.
oc 2	Able to understand distribution systems and networks, load characteristics and voltage levels
oc 3	Able to understand main principles of distribution systems planning and design. Particular attention will be given to the issue of industrial medium voltage distribution systems through case studies, practical design assignments and

	design verification using power system analysis software.
oc 4	Produce and prepare how to understand solar energy systems and linking them to the project.

2- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

LO 1	Identifies the basic of power system construction, function, voltage levels and load characteristics basic definitions and relevant equations.
LO 2	Demonstrate the principals of designing distribution systems consisting of dynamic and static loads.

b. Psychomotor Domains (LOs):

LO 3	Apply knowledge to calculate the distribution systems performance
LO 4	Prepare and present analysis of load flow, short circuits results for distribution systems using power system analysis packages.
LO 5	Utilize the circuits' analysis, machine, and power system analyses fundamentals in sizing distribution systems equipment.

c. Affective Domains (LOs):

-	None

3- Program LOs served by the course:

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

Lo13.	Explain the basic electrical power system theory.
Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
Lo15.	Explain the diverse applications of electrical power equipment.
Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
Lo17.	Define the Basics of low voltage power systems.
Lo18.	Identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
Lo30.	. Integrate electrical, electronic, and mechanical components and equipment with

	transducers, actuators, and controllers in creatively computer-controlled systems.
Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.

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

Course (LOs)		program competencies	
LO 1	Identifies the basic of power system construction, function, voltage levels and load characteristics basic definitions and relevant equations.	Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
		Lo17.	Define the Basics of low voltage power systems.
		Lo18.	Identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
LO 2	Demonstrate the principals of designing distribution systems consisting of dynamic and static loads.	Lo13.	Explain the basic electrical power system theory.
		Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
		Lo15.	Explain the diverse applications of electrical power equipment.
LO 3	Apply knowledge to calculate the distribution systems performance	Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
LO 4	Prepare and present analysis of load flow, short circuits results for distribution systems using power system analysis packages.	Lo30.	. Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
LO 5	Utilize the circuits analysis, machine, and power system	Lo31.	To design, simulate and practice the techniques of hardware and software tools

	analyses fundamentals in sizing distribution systems equipment.	in Power systems, Power Electronics and Renewable Energy systems.

5- 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	Project motivation, problem statement, and objectives	1	0	3	LO1
2	Hospital design criteria, Layouts sample	1	0	3	LO2
3	Load Estimation & Bulky Equipment Sizing	1	0	3	LO3
4	Brief on load estimation, Loads classifications	1	0	3	LO4
5	Project progress seminar (1)	1	0	3	LO4
6	Overview of the Egyptian Standards for Transformer, How do we select the appropriate generator .	1	0	3	LO5
7	Project progress seminar (2)	1	0	3	LO5
8	Midterm- Break				
9	UPS sizing, Type of ups, How do we select ups	1	0	3	LO1
10	Indoor Lighting System Design	1	0	3	LO2
11	Project progress seminar (3)	1	0	3	LO2
12	Fundamentals and terminologies	1	0	3	LO1
13	Luminaires used in project	1	0	3	LO1
14	Verification from Dialux Evo software	1	0	3	LO3
15	Writing project final report	1	0	3	LO3
16	Writing project final report		2.0		
Total hours		14	0	42	--

6- 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
Lo1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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.

7- Student assessment method

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

Course lLOs	Tools of assessment											
	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling	
Lo1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)

Discussions	Every week for any student
Presentations	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	(60) marks
the Projects	30%		
Practical modelling	20%		
Attendance		(5) marks	
Mid-term exam		(40) marks	
final exam			(40) marks
Total			(100) marks

8- 10- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	▪ Egyptian Code & Regulations. ▪ Philips Lighting catalogue. ▪ Grounding and bounding electrical system book. ▪ Dr. Gilany Electrical design book. ▪ Schneider Electric Sockets Catalogue. ▪ Schneider circuit breaker catalogue
c) Recommend books	None
d) Periodicals, Web sites, etc	No periodicals are needed.

9- Facilities required for teaching and learning:

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

10- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra assignments

program Coordinator	Dr. Abdallah Reda El-Sayed Eissa
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2023/2024

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

Course specification

Course code:	Course name
BASE 307	Contracts, Bids & Liabilities
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	2021-2022

B-Basic Information

Title	Contracts, Bids & Liabilities
Code	BASE 307
level courses	Fifth level courses (Senior -2)-First semester (Fall)
Credit Hours	2Cr. hr
Lectures	2hr
Tutorial	0hr
Total	2hr
Prerequisite	-
Instructor name/Email	DR. Ashraf Abdelkhalek Ashref.abdel.khalek@sva.edu.eg

C- Professional information

1- Course core

Contract definition, formation principles of a contract, performance or breach of contract obligations, termination of agreements, types of construction contracts and legal implications, specifications, legal organizational structures (agency, proprietorship, partnership, corporation).

2- Course learning objectives:

oc 1	Recognize the basic principles of contracts, bids & liabilities.
oc 2	Explain how to to execute projects considering time, cost & quality.
oc 3	Able to understand how to demonstrate how to monitor and control projects.
oc 4	Able to understand how to learn skills to issuing contracts.
oc 5	Produce and prepare the professional knowledge of quantities estimation
oc 6	Recognize how apply the applications of basic principles of project management.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

Lo1	Identifies the basic of quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.
Lo2	Display the business and management principles relevant to engineering.
Lo3	Demonstrate the risks, and take appropriate steps to manage those risks

b. Psychomotor Domains (LOs):

Lo4	Apply knowledge to implement comprehensive engineering knowledge and understanding and intellectual skills in projects
Lo5	Prepare and present technical material.
Lo6	Utilize the basic organizational and project management skills.

c. Affective Domains (LOs):

-	None

4- Program LOs served by the course:

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

Lo3.	Assess and evaluate findings.
Lo4.	Use statistical analyses and objective engineering judgment to draw conclusions.
Lo5.	Display global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.
Lo6.	Define standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.
Lo7.	State the factors affecting the engineering projects.
Lo21.	Conduct and develop appropriate experimentation.
Lo24.	Conduct techniques and methods of investigation as researches and reports.
Lo25.	Plan, supervise and monitor implementation of engineering projects.

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

Course (LOs)		program competencies
Lo1	Identifies the basic of quality assurance systems, codes of practice and standards, health and safety requirements and environmental issues.	Lo3. Assess and evaluate findings. Lo4. Use statistical analyses and objective engineering judgment to draw conclusions.

Lo2	Display the business and management principles relevant to engineering.	Lo7.	State the factors affecting the engineering projects.
Lo3	Demonstrate the risks, and take appropriate steps to manage those risks	Lo5.	Display global, cultural, social, economic, environmental, ethical and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.
		Lo6.	Define standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.
Lo4	Apply knowledge to implement comprehensive engineering knowledge and understanding and intellectual skills in projects	Lo21.	Conduct and develop appropriate experimentation.
Lo5	Prepare and present technical material.	Lo24.	Conduct techniques and methods of investigation as researches and reports.
Lo6	Utilize the basic organizational and project management skills.	Lo25.	Plan, supervise and monitor implementation of engineering projects.

6- 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 the course and its objectives and learning outcomes	2	0	0	Lo1
2	Contracts definitions – Formatting and types –	2	0	0	Lo1
3	Components of contracts	2	0	0	Lo2, Lo3
4	Bids and Liabilities	2	0	0	Lo2, Lo3
5	Relationship between concerned people in construction projects - stages of project preparation	2	0	0	Lo1, Lo6
6	Tender documents	2	0	0	Lo2
7	Tendering procedures	2	0	0	Lo2
8	Midterm		1.0		

9	Calculations of quantities & (Quiz)	2	0	0	Lo1, Lo2, Lo3, Lo6
10	Final invoice – Specifications: Types of specifications	2	0	0	Lo2
11	Types of contracts and judgment	2	0	0	Lo2
12	Public & Private sectors Partnership	2	0	0	Lo4, Lo5
13	B.O.T projects	2	0	0	Lo4, Lo5
14	Claims	2	0	0	Lo1, Lo2, Lo3
15	Final invoice – Specifications: Types of specifications	2	0	0	Lo2
16	Final Exam		2.0		
Total hours		28	0	0	--

7- 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
Lo1	✓			✓	✓							✓	
Lo2	✓			✓	✓				✓			✓	
Lo3	✓								✓			✓	
Lo4	✓			✓					✓			✓	
Lo5	✓				✓				✓				
Lo6				✓								✓	

Notes:

The research concerns the discussion.

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.

8- Student assessment method

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

Course	Tools of assessment

ILOs	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
Lo1		✓	✓					✓			
Lo2	✓	✓	✓	✓				✓	✓		
Lo3	✓		✓						✓		
Lo4	✓	✓	✓					✓	✓		
Lo5	✓		✓						✓		
Lo6		✓	✓	✓				✓			

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Sheets and Sketches		Week (2,3)
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	20%		
Sheets and Sketches	60%	10 marks	(50) marks
Researches and reports	20%		
Attendance		(10) marks	
Mid-term exam		(20) marks	
final exam			(50) marks
Total			(100) marks

9- List of references:

a)	Course notes	Lecture notes and handouts
b)	Required books	Charoenngam, Chotchai, and Chien-Yuan Yeh. "Contractual risk and liability sharing in hydropower construction." International Journal of Project Management 17.1 (1999): 29-37
c)	Recommend books	Mentioned at time.
d)	Periodicals, Web sites, etc	No periodicals are needed.

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 assignments

Course coordinator:	Dr. Ashraf Abdel Khaliq Mostafa
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Amera Marye
Date:	2023/2024

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

Course specification

Course code:	Course name
BASE 308	Seminar
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	2023-2024

B-Basic Information

Title	Seminar
Code	BASE 308
level courses	Fifth level courses (Senior -2)-First semester (Fall)
Credit Hours	2Cr. hr
Lectures	2hr
Tutorial	0hr
Total	2hr
Prerequisite	-
Instructor name/Email	Dr. Ahmed Refaat ahmed.refaat@sva.edu.eg

C- Professional information

1- Course core

Engineering Topics conducted on a Weekly or Monthly Basis discussions with speakers from Industry and professors from the different Departments. Students should at least attend one seminar every year

2- Course learning objectives:

oc 1	Able to understand the design diverse aspects of development.
oc 2	Recognize how contribute with the latest business models concerning architectural design.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

-	None

b. Psychomotor Domains (LOs):

- None

c. Affective Domains (LOs):

LO1	Communicate effectively with contemporary technologies, codes of practice and standards, quality guidelines.
LO2	Explain the heighten awareness of research techniques and methods of investigation.
LO3	Explain the heighten awareness of multidisciplinary team and communicate effectively in conducting physical and multimedia modeling.
LO4	Communicate effectively with verbally and in writing – with a range of audiences.

4- Program LOs served by the course:

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

Lo33.	Communicate to convey ideas verbally, numerically, graphically, and using symbols effectively with a range of audiences.
Lo34.	Use creative, innovative and flexible thinking.
Lo35.	Acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
Lo36.	Practice self-learning and other learning strategies.

5- The relation between the course learning outcomes and the program LOs

Course (LOs)		program LOs	
LO1	Communicate effectively with contemporary technologies, codes of practice and standards, quality guidelines.	Lo33.	Communicate to convey ideas verbally, numerically, graphically, and using symbols effectively with a range of audiences.
LO2	Explain the heighten awareness of research techniques and methods of investigation.	Lo34.	Use creative, innovative and flexible thinking.
LO3	Explain the heighten awareness of multidisciplinary team and communicate effectively in conducting physical and multimedia modeling.	Lo35.	Acquire entrepreneurial and leadership skills to anticipate and respond to new situations.
LO4	Communicate effectively with verbally and in writing – with a range of audiences.	Lo36.	Practice self-learning and other learning strategies.

6- 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 the course and its objectives and learning outcomes	2	0	0	Lo1
2	Introduce the design diverse aspects of development	2	0	0	Lo1, Lo3
3	Research 1st draft discussion	2	0	0	Lo2, Lo4
4	Research 2nd draft discussion	2	0	0	Lo1, Lo3
5	Research 3rd draft discussion	2	0	0	Lo2, Lo4
6	Research 4th draft discussion	2	0	0	Lo2, Lo4
7	Research 5th draft discussion	2	0	0	Lo2, Lo4
8	Midterm		1.0		
9	Learning Skills	2	0	0	Lo1, Lo3
10	Contemporary design terms and concepts	2	0	0	Lo1, Lo3
11	Research 1st draft discussion	2	0	0	Lo2, Lo4
12	Research 2nd draft discussion	2	0	0	Lo2, Lo4
13	Business model dashboard	2	0	0	Lo1, Lo3
14	Final feedback of Researches.	2	0	0	Lo4
15	Submitted Final Researches & Discussions.	2	0	0	Lo4
16	Final Exam		2.0		
Total hours		28	0	0	--

7- 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
Lo1		✓							✓		✓		
Lo2		✓							✓			✓	
Lo3		✓							✓	✓			
Lo4		✓							✓	✓	✓	✓	

Notes:

The research concerns the cooperative work and the presentations.
The Tutorials concerns on sheets.
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.

8- 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
Lo1			✓						✓	✓	
Lo2			✓					✓	✓		
Lo3			✓						✓		
Lo4			✓				✓		✓	✓	

Notes:

- Submission must be a periodical technical presentation.
- Final submission is A4 paper.
- The student has to report his own work through the current academic course.
- Printing and electronic versions of the report are required.
- The discussion and students' participants are very essential.
- The evaluations are internal periodical assessments.
- Student grades are available and posted in the class.

b- Time schedule of assessment

Discussions	Every week for any student
Presentations	weekly
Researches and reports	Week (2,3)
Attendance	weekly
final exam	Week (16)

c- Grading system

Attendance & Participation	(20) marks	50 marks
Report Final Discussion	(30) marks	
Report Final Submission		(50) marks
Total		(100) marks

9- List of references:

a) Course notes

Lecture notes and handouts

b) Required books

- Adaptive Environments Center (AEC). 1989. A CONSUMER'S GUIDE TO HOME ADAPTATION. Boston: Author.
- BARRIER-FREE AND BEAUTIFUL HOUSE PLANS. Volume 1. 200?. Des Moines, IA: FMR Home Portfolio.
- Bringa, O. R., Christophersen, J., Nordang, A. & Ronnevig, T. 2004. BUILDING FOR ALL: GUIDE BOOK ON UNIVERSAL DESIGN OF BUILDINGS AND OUTDOOR SPACES. The National Office of Building
- Center for Universal Design. 1998. PROCEEDINGS: DESIGNING FOR THE 21ST CENTURY I: INTERNATIONAL UNIVERSAL DESIGN CONFERENCE. Raleigh, NC: NCSU School of Design.
- Dobkin, I. & Peterson, M. J. 2000. UNIVERSAL INTERIORS BY DESIGN: GRACIOUS SPACES. New York: McGraw-Hill.
- Home Planners, LLC. 2000. PRODUCTS AND PLANS FOR UNIVERSAL HOMES. Tucson, AZ: Hanley-Wood LLC.
- International Code Council/American National Standards Institute. 2003. VOL-UNTARY STANDARD FOR ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES (ICC/ANSI A117.1-2003).
- Leibrock, C. & Terry, J. E. 1999. BEAUTIFUL UNIVERSAL DESIGN: A VISUAL GUIDE. New York: Wiley.
- Levine, D. (Ed.) 2003. UNIVERSAL DESIGN NEW YORK 2. Buffalo: Center for Inclusive Design and Environmental Access, State University at Buffalo, NY
- Mueller, J. 1998. CASE STUDIES IN UNIVERSAL DESIGN. Raleigh, NC: Center for Universal Design (available at CUD).
- National Office of Building Technology (Norway). 2005. BUILDING FOR EVERYONE: UNDERSTANDING UNIVERSAL DESIGN OF BUILDINGS AND OUTDOOR SPACES.

– Adaptive Environments Center (AEC). 1989. A CONSUMER'S GUIDE TO HOME ADAPTATION. Boston: Author.
– BARRIER-FREE AND BEAUTIFUL HOUSE PLANS. Volume 1. 200?. Des Moines, IA: FMR Home Portfolio.
– Bringa, O. R., Christophersen, J., Nordang, A. & Ronnevig, T. 2004. BUILDING FOR ALL: GUIDE BOOK ON UNIVERSAL DESIGN OF BUILDINGS AND OUTDOOR SPACES. The National Office of Building
– Center for Universal Design. 1998. PROCEEDINGS: DESIGNING FOR THE 21ST CENTURY I: INTERNATIONAL UNIVERSAL DESIGN CONFERENCE. Raleigh, NC: NCSU School of Design.
– Dobkin, I. & Peterson, M. J. 2000. UNIVERSAL INTERIORS BY DESIGN: GRACIOUS SPACES. New York: McGraw-Hill.
– Home Planners, LLC. 2000. PRODUCTS AND PLANS FOR UNIVERSAL HOMES. Tucson, AZ: Hanley-Wood LLC.
– International Code Council/American National Standards Institute. 2003. VOL-UNTARY STANDARD FOR ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES (ICC/ANSI A117.1-2003).
– Leibrock, C. & Terry, J. E. 1999. BEAUTIFUL UNIVERSAL DESIGN: A VISUAL GUIDE. New York: Wiley.
– Levine, D. (Ed.) 2003. UNIVERSAL DESIGN NEW YORK 2. Buffalo: Center for Inclusive Design and Environmental Access, State University at Buffalo, NY
– Mueller, J. 1998. CASE STUDIES IN UNIVERSAL DESIGN. Raleigh, NC: Center for Universal Design (available at CUD).
National Office of Building Technology (Norway). 2005. BUILDING FOR EVERYONE: UNDERSTANDING UNIVERSAL DESIGN OF BUILDINGS AND OUTDOOR SPACES.

c) Recommend books — Mentioned at time.
d) Periodicals, Web — No periodicals are needed.

sites, etc

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 assignments

Course coordinator:	Dr. Ahmed Refaat	Ahmed
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul	
Head of the Department	Dr. Amera Marye	
Date:	2023/2024	

Fifth level courses (Senior -2)

Second semester (Spring)

No.	Cod	Course Name	Instructor
1	CECE 437	Electrical Machines IV	Ass. Prof. Dr. Shady Abdel Aleem
2	CECE 446	Planning of Electrical Networks	Ass. Prof. Dr. Shady Abdel Aleem
3	CECE 428	Power System Protection	Dr. Salem Abdel Aziz Fikri Ahmed Sheikh & Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
4	CECE 455	Selected topics in Electrical Power Engineering	Ass. Prof. Dr. Shady Abdel Aleem
5	CECE 491	Senior Project II	Ass. Prof. Dr. Shady Abdel Aleem & Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
6	CECE 424	Control System	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul

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

Course specification

Course code:	Course name
CECE 437	Electrical Machines IV
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	2023-2024

B-Basic Information

Title	Electrical Machines IV
Code	CECE 437
level courses	Fifth level courses (Senior -2)-Second semester (Spring)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Lab	2hr
Total	6hr
Prerequisite	CECE 436
Instructor name/Email	Dr. Sabah Ibrahim Muhammad

C- Professional information

1- Course core

Induction machines: Theory and design: Introduction, Construction of three- phase induction motors, The magnetic circuit, Slip ring induction motors, Cage motors, Performance at constant flux, Electromotive force, Currents, Torque, Equivalent circuits, Torque speed curves, Phasor diagrams, The circle diagram, Starting methods, Classification of induction motors, High starting torque types, Performance with higher harmonics, Testing of induction motors, The induction generator, The induction regulator, Induction type phase shifter, Single phase induction motors, Construction, Theory of rotating fields, Methods of starting, Fractional horsepower motors, Design of three-phase motors, The output equation, Selection of the main dimensions, Standard frames, Windings, Power.

2- Course learning objectives:

oc 1	Explain the principle of Three-phase Induction Motors (Asynchronous Motors): Overview of three-phase induction motor, Construction, Stator construction, Rotor construction, Squirrel cage type, Wound rotor type, Enclosure,

	Induction Motor Squirrel Cage Rotor, Nameplate.
oc 2	Explain the principle of Rotating magnetic field, Analytical & graphical method, Running operation, Slip speed, Per unit slip; Rotator induced voltage and frequency under running at slip s%.
oc 3	Able to understand equivalent circuit, Induction Motor Losses and Efficiency, Torque Equation for an Induction Motor, Induction Motor Torque–speed Characteristics.
oc 4	Able to understand with starting Methods for Squirrel-cage Induction Motors, Starting Methods for Wound Rotor Induction Motors, Advantages of Squirrel-cage Induction Motors, Advantages of Wound Rotor Induction Motors, Uses of Three-phase Induction Motors, The choice of starting method depends on Permitted starting current, Short circuit capacity on the network, Maximum allowed voltage drop on the terminals during start, Minimum starting torque, Maximum starting torque, Load inertia, Process requirements, Economic aspect Principle of operation Power flow, losses and efficiency.
oc 5	Recognize how apply the torque-speed characteristics, Speed control, Single-phase induction motors, Speed Control of 3- Phase Induction Motor, Phase Induction Motor, Double revolving field theory, Torque, Equivalent circuits, Torque speed curves, Phasor diagrams, The circle diagram, Starting methods, Classification of induction motors, High starting torque types, Performance with higher harmonics, Testing of induction motors, Examples in motor performance.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

LO1	Identifies the basic of three-phase Induction Motors (Asynchronous Motors): Overview of three-phase induction motor, Construction, Stator construction, Rotor construction, Squirrel cage type, Wound rotor type, Enclosure, Induction Motor Squirrel Cage Rotor, Nameplate.
LO2	Display the Rotating magnetic field, Analytical & graphical method, Running operation, Slip speed, Per unit slip; Rotator induced voltage and frequency under running at slip s%.

b. Psychomotor Domains (LOs):

LO3	Apply knowledge to understand equivalent circuit, prepare and present induction Motor Losses and Efficiency, Torque Equation for an Induction Motor, Induction Motor Torque–speed Characteristics.
LO4	Utilize the basics to calculate Starting Methods for Squirrel-cage Induction

	Motors, Starting Methods for Wound Rotor Induction Motors, Advantages of Squirrel-cage Induction Motors, Advantages of Wound Rotor Induction Motors, Uses of Three-phase Induction Motors, The choice of starting method depends on Permitted starting current, Short circuit capacity on the network, Maximum allowed voltage drop on the terminals during start, Minimum starting torque, Maximum starting torque, Load inertia, Process requirements, Economic aspect Principle of operation Power flow, losses and efficiency.
LO5	Apply knowledge to present torque-speed characteristics, Speed control, Single-phase induction motors, Speed Control of 3- Phase Induction Motor, Phase Induction Motor, Double revolving field theory, Torque, Equivalent circuits, Torque speed curves, Phasor diagrams, The circle diagram, Starting methods

c. Affective Domains (LOs):

LO6	Communicate effectively with classification of induction motors, High starting torque types, Performance with higher harmonics, Testing of induction motors, Examples in motor performance.

4- Program competencies served by the course:

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

Lo13.	Explain the basic electrical power system theory.
Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
Lo15	Explain the diverse applications of electrical power equipment.
Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering
Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

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

Course (LOs)		program competencies	
		Lo13.	Explain the basic electrical power system theory.
LO1	Identifies the basic of three-phase Induction Motors (Asynchronous Motors): Overview of three-phase induction motor, Construction, Stator construction, Rotor construction, Squirrel cage type, Wound rotor type, Enclosure, Induction Motor Squirrel Cage Rotor, Nameplate.	Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
		Lo15.	Explain the diverse applications of electrical power equipment.
LO2	Display the Rotating magnetic field, Analytical & graphical method, Running operation, Slip speed, Per unit slip; Rotator induced voltage and frequency under running at slip s%.	Lo13.	Explain the basic electrical power system theory.
		Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
LO3	Apply knowledge to understand equivalent circuit, prepare and present induction Motor Losses and Efficiency, Torque Equation for an Induction Motor, Induction Motor Torque–speed Characteristics.	Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
LO4	Utilize the basics to calculate Starting Methods for Squirrel-cage Induction Motors, Starting Methods for Wound Rotor Induction Motors, Advantages of Squirrel-cage	Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.

	Induction Motors, Advantages of Wound Rotor Induction Motors, Uses of Three-phase Induction Motors, The choice of starting method depends on Permitted starting current, Short circuit capacity on the network, Maximum allowed voltage drop on the terminals during start, Minimum starting torque, Maximum starting torque, Load inertia, Process requirements, Economic aspect Principle of operation Power flow, losses and efficiency.		
LO5	Apply knowledge to present torque-speed characteristics, Speed control, Single-phase induction motors, Speed Control of 3- Phase Induction Motor, Phase Induction Motor, Double revolving field theory, Torque, Equivalent circuits, Torque speed curves, Phasor diagrams, The circle diagram, Starting methods	Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
		Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
LO6	Communicate effectively with classification of induction motors, High starting torque types, Performance with higher harmonics, Testing of induction motors, Examples in motor performance.	Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
		Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering

Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

6- 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: Three-phase Induction Motors (Asynchronous Motors): Overview of three-phase induction motor, Construction, Stator construction, Rotor construction, Squirrel cage type, Wound rotor type, Enclosure, Induction Motor Squirrel Cage Rotor, Nameplate.	2	2	2	Lo1
2	Rotating magnetic field, Analytical & graphical method, Running operation, Slip speed, Per unit slip, Rotator induced voltage and frequency under running at slip s%.	2	2	2	LO 1
3	Focuses on Equivalent circuit, Induction Motor Losses and Efficiency, Torque Equation for an Induction Motor, Induction Motor Torque–speed Characteristics.	2	2	2	LO 1
4	Quiz (1) +Focuses on Starting Methods for Squirrel-cage Induction Motors, Starting Methods for Wound Rotor Induction Motors.	2	2	2	LO 2
5	Focuses on Advantages of Squirrel-cage Induction Motors, Advantages of Wound Rotor Induction Motors, Uses of Three-phase Induction Motors.	2	2	2	LO 3

6	Focuses on The choice of starting method depends on Permitted starting current, Short circuit capacity on the network, Maximum allowed voltage drop on the terminals during start, Minimum starting torque, Maximum starting torque, Load inertia, Process requirements, Economic aspect	2	2	2	LO 3
7	Principle of operation Power flow, losses and efficiency, Torque-speed characteristics, Speed control, Single-phase induction motors. Speed Control of 3- Phase Induction Motor.	2	2	2	LO 3
8	Midterm		1.0		
9	Focuses on Phase Induction Motor, Double revolving field theory, Torque, Equivalent circuits.	2	2	2	LO 4
10	Torque speed curves, Phasor diagrams, The circle diagram.	2	2	2	LO 4
11	Focuses on Starting methods, Classification of induction motors, High starting torque types, Performance with higher harmonics.	2	2	2	LO6
12	Quiz (2) + Basic Principle of asynchronous Motor.	2	2	2	LO6
13	Focuses on Equivalent Circuit of a asynchronous Motor	2	2	2	LO4
14	Focuses on Solved examples on Equivalent Circuit of a asynchronous Motor.	2	2	2	LO3
15	Focuses on Applications of asynchronous Motors and examples on Torque speed curves, Phasor diagrams, The circle diagram.	2	2	2	LO5
16	Final Exam		2.0		
Total hours		28	28	28	--

7- 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
Lo1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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.

8- Student assessment method

d- 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	
Lo1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

e- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations		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 (7)	
final exam		Week (14)	

f- 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	▪ Ion Boldea, Syed A. Nasar," The Induction Machine Handbook," CRC Press ,Boca Raton London New York Washington, D.C. ▪ P.C.SEN, "PRINCIPLES OF ELECTRIC MACHINES AND POWER ELECTRONICS, "John Wiley & Sons. TURAN GÖNEN," ELECTRICAL MACHINES WITH MATLAB,"CRC Press, Taylor& Francis Group.
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 assignments

Course coordinator:	Dr. Sabah Ibrahim Muhammad
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2023/2024

Course specification

Course code:	Course name
CECE 446	Planning of Electrical Networks
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	2023-2024

B-Basic Information

Title	Planning of Electrical Networks
Code	CECE 446
level courses	Fifth level courses (Senior -2)-Second semester (Spring)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Lab	0hr
Total	4hr
Prerequisite	CECE 323
Instructor name/Email	Dr. Sabah Ibrahim Muhammad

C- Professional information

1- Course core

The utility perspective , utility financial, utility economic evaluation, fixed charge rate, total annual charge rate, revenue requirements, financial and regulatory analysis, corporate financial situation, regulatory incentive, utility incentives, Power generation economics, Co-generation over view and regulations, Stream turbine Co-generation cycles, Gas turbine cycles, Generation planning, Manual and automated generation planning, Dynamic programming, approximate techniques and automated generation planning, Approximate technique, Capacity resource planning. Integrated demand-supply planning, Marginal costs.

2- Course learning objectives:

oc 1	Explain the principle of the generation adequacy yin power system using probabilistic approach
oc 2	Recognize how to analyze the configuration of substations and power pools
oc 3	Recognize how to evaluate the peak demand and energy requirements of system

	using forecasting techniques.
oc 4	Recognize how apply the developing of the solution methodology for optimizing the cost of power system under operation.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

LO1	Identifies the basic of load curves, Single line diagram of any power system, types of generation stations, simple cycle and combined cycle based stations.
LO2	Display the maximum demand, monthly consumption of electricity, demand factor, load factor and form factor from load curve.

b. Psychomotor Domains (LOs):

LO3	Apply knowledge to draw chronological load curve for each type of load and total load, load duration curve, energy load curve and mass curve.
LO4	Prepare and present calculation for plant capacity factor, utilization factor and diversity factor between sub-stations and feeders of substations.
LO5	Prepare and present calculation for total cost of generation, annual total cost of operating a certain plant, fixed change rate factors and average cost of generated energy per year.
LO6	Apply knowledge to determine the energy cost at load bus, increase of the cost/kwh at load bus due to transmission systems.

c. Affective Domains (LOs):

-	None

4- Program LOs served by the course:

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

Lo14.	Basic power system design concepts for underground, cable tray, grounding, and lighting systems.
Lo16.	Principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo26.	Analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical power and machines.
Lo28.	Analyze the performance of electric power generation, control, and distribution systems.

5- The relation between the course learning outcomes and the program LOs

Course (LOs)		program LOs	
LO1	Identifies the basic of load curves, Single line diagram of any power system, types of generation stations, simple cycle and combined cycle based stations.	Lo13.	Explain the basic electrical power system theory.
		Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
LO2	Display the maximum demand, monthly consumption of electricity, demand factor, load factor and form factor from load curve.	Lo15.	Explain the diverse applications of electrical power equipment.
		Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
		Lo17.	define the Basics of low voltage power systems.
		Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
LO3	Apply knowledge to draw chronological load curve for each type of load and total load, load duration curve, energy load curve and mass curve.	Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
LO4	Prepare and present calculation	**Lo26.**	Analyze design problems and interpret

	for plant capacity factor, utilization factor and diversity factor between sub-stations and feeders of substations.		numerical data and test and examine components, equipment and systems of electrical power and machines.
LO5	Prepare and present calculation for total cost of generation, annual total cost of operating a certain plant, fixed change rate factors and average cost of generated energy per year.	Lo30.	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
LO6	Apply knowledge to determine the energy cost at load bus, increase of the cost/kwh at load bus due to transmission systems.	Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.

6- 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: Generating System capability Planning	2	2	2	LO1
2	Interconnected Systems	2	2	2	LO1
3	Demand/ Energy forecasting	2	2	2	LO6
4	Quiz (1) + Power System expansion planning	2	2	2	LO2
5	Focuses on Design of Distribution Systems	2	2	2	LO3
6	Focuses on Load Curves	2	2	2	LO3
7	Generation Economy	2	2	2	LO3
8	Midterm		1.0		
9	Focuses on Transmission Economy	2	2	2	LO4
10	Tariffs	2	2	2	LO6
11	Focuses on Power factor Compensation.	2	2	2	LO5
12	Quiz (2) + Economic Dispatch	2	2	2	LO5
13	Focuses on Examples of Focuses on	2	2	2	LO4

	Power factor Compensation.				
14	Focuses on Solved examples on Transmission Economy	2	2	2	LO3
15	Focuses on Examples on Generation Economy	2	2	2	LO5
16	Final Exam		2.0		
Total hours		28	28	28	--

7- 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												
Lo1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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.

8- Student assessment method

g- 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
Lo1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

h- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations		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)

i- 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

9- List of references:	
a) Course notes	Lecture notes and handouts
b) Required books	▪ J. Bebic, 2008, Power System Planning: Emerging Practices Suitable for Evaluating the Impact of High-Penetration Photovoltaics., Niskayuna, New York, GE Global Research. ▪ Lennart Söder and Mikael Amelin,2011, "Efficient Operation and Planning of Power System", 11th edition, Stockholm, Royal Institute of Technology Electric Power Systems.
c) Recommend books	Mentioned at time.
d) Periodicals, Web sites, etc	No periodicals are needed.

10- Facilities required for teaching and learning:

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

11- Requirements for Disable facilities:

- On line teaching hours if it is needed
- Extra assignments

Course coordinator:	Dr. Sabah Ibrahim Muhammad
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2023/2024

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

Course specification

Course code:	Course name
CECE 428	Power System Protection
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	2023-2024

B-Basic Information

Title	Power System Protection
Code	CECE 428
level courses	Fifth level courses (Senior -2)- Second semester (Spring)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Lab	2hr
Total	6hr
Prerequisite	CECE 323
Instructor name/Email	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul ihab.nabil@sva.edu.eg

C- Professional information

1-course core

Covers unsymmetrical fault analysis, fuses, voltage and current transducers, fundamental relay operating principles and characteristics, over current protection, comparators and static relay circuits, differential protection and its application to generators, transformers and bus bars, motor protection, pilot wire protection of feeders and standard protective schemes for system coordination of relays

2- Course learning objectives:	
oc 1	Recognize the performance of protective relays, components of protection scheme and relay terminology.
oc 2	Able to understand relay construction and operating principles.
oc 3	Able to understand Over-current protection using electromagnetic and static relays and Over-current protective schemes.

oc 4	Explain how to discuss types of electromagnetic and static distance relays, effect of arc resistance, power swings, line length and source impedance on performance of distance relays.
oc 5	Able to understand pilot protection; wire pilot relaying and carrier pilot relaying.
oc 6	Explain the principle of construction, operating principles, and performance of various differential relays for differential protection.
oc 7	Explain the principle of protection of generators, motors, Transformer and Bus Zone Protection.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

LO1	Identifies the basic about the performance of protective relays, components of protection scheme and relay terminology overcurrent protection.
LO2	Display the basic for working the distance relays and the effects of arc resistance, power swings, line length and source impedance on performance of distance relays.

b. Psychomotor Domains (LOs):

LO3	Apply knowledge to understand the pilot protection; wire pilot relaying and carrier pilot relaying.
LO4	Prepare and present construction, operating principles, and performance of differential relays for differential protection.

c. Affective Domains (LOs):

LO5	Communicate effectively with protection of generators, motors, Transformer and Bus Zone Protection.

4- Program LOs served by the course:

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

Lo16.	Principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo13.	Explain the basic electrical power system theory.
Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
Lo15.	Explain the diverse applications of electrical power equipment.

Lo16.	Explain the basic power system design concepts for underground, cable tray, grounding, and lighting systems.
Lo17.	define the Basics of low voltage power systems.
Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.
Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering
Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

5- The relation between the course learning outcomes and the program LOs

Course (LOs)		program LOs	
Lo1	Identifies the basic about the performance of protective relays, components of protection scheme and relay terminology over-current protection.	Lo13.	Explain the basic electrical power system theory.
		Lo14.	Merge theories and techniques for calculating short circuit, motor starting, and voltage drop in the projects.
		Lo15.	Explain the diverse applications of electrical power equipment.
Lo2	Display the basic for working the distance relays and the	Lo16.	Explain the basic power system design concepts for underground, cable tray,

	effects of arc resistance, power swings, line length and source impedance on performance of distance relays.		grounding, and lighting systems.
		Lo17.	define the Basics of low voltage power systems.
		Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo3		Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
	Apply knowledge to understand the pilot protection; wire pilot relaying and carrier pilot relaying.	Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.
Lo4	Prepare and present construction, operating principles, and performance of differential relays for differential protection.	Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
Lo5		Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
	Communicate effectively with protection of generators, motors, Transformer and Bus Zone Protection	Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering
		Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

6- 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: Need for protective schemes, Nature and Cause of Faults, Types of Faults, Effects of Faults, Fault Statistics, Zones of Protection, Primary and Backup Protection,	2	2	2	Lo1
2	Focuses on Essential Qualities of Protection, Performance of Protective Relaying, Classification of Protective Relays, Automatic Reclosing, Current Transformers for protection, Voltage Transformers for Protection.	2	2	2	LO 1
3	Focuses on Electromechanical Relays, Static Relays – Merits and Demerits of Static Relays, Numerical Relays, Comparison between Electromechanical Relays and Numerical Relays	2	2	2	LO 1
4	Quiz (1) + Time – current Characteristics, Current Setting, Time Setting. Overcurrent Protective Schemes, Reverse Power or Directional Relay, Protection of Parallel Feeders, Protection of Ring Mains.	2	2	2	LO 1
5	Focuses on Earth Fault and Phase Fault Protection, Combined Earth Fault and Phase Fault Protective Scheme, Phase Fault Protective Scheme, Directional Earth Fault Relay, Static Overcurrent Relays, Numerical Overcurrent Relays.	2	2	2	LO 2
6	Focuses on Impedance Relay, Reactance Relay, Mho Relay, Angle Impedance Relay, Effect of Arc Resistance on the Performance of Distance Relays, Reach of Distance Relays.	2	2	2	LO 3
7	Focuses on the Effect of Power Surges (Power Swings) on Performance of Distance Relays, Effect of Line Length and	2	2	2	LO 3

	Source Impedance on Performance of Distance Relays.				
8	Midterm		1.0		
9	Introduction, Differential Relays, Simple Differential Protection, Percentage or Biased Differential Relay.	2	2	2	LO 4
10	Focuses on the Differential Protection of 3 Phase Circuits, Balanced (Opposed) Voltage Differential Protection.	2	2	2	LO 4
11	Focuses on the Generator Protection	2	2	2	LO5
12	Design of Motor Protection	2	2	2	LO5
13	Focuses on Bus Protection	2	2	2	LO5
14	Quiz (2) + Line Protection+ Fault Location Techniques for Transmission Systems	2	2	2	LO5
15	Focuses on Distribution System Protection	2	2	2	LO5
16	Final Exam		2.0		
Total hours		28	28	28	--

7- 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												
Lo1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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.

8- Student assessment method

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

Course	Tools of assessment

ILOs	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling
Lo1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations		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 (7)
final exam		Week (14)

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
b) Required books

Lecture notes and handouts

- Protection and Switchgear Bhavesh et al Oxford 1 st Edition, 2011
- Power System Switchgear and Protection N. Veerappan S.R. Krishnamurthy S. Chand 1 st Edition, 2009
- Fundamentals of Power System Protection Y.G.Paithankar S.R. Bhide PHI 1 st Edition, 2009

c) Recommend books	Mentioned at time.
d) Periodicals, Web sites, etc	No periodicals are needed.

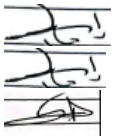
11- Facilities required for teaching and learning:

- 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 assignments

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:	2023/2024



Course specification

Course code:	Course name
CECE 455	Selected topics in Electrical Power Engineering
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	2023-2024

B-Basic Information

Title	Selected topics in Electrical Power Engineering
Code	CECE 455 Fifth level courses (Senior -2)-Second semester (Spring)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Lab	0hr
Total	4hr
Prerequisite	Senior Standing
Instructor name/Email	Dr. Sabah Ibrahim Muhammad

C- Professional information

1- course core

Topics chosen according to special interests of faculty and students. May be repeated for credit more than once if content changes

2- Course learning objectives:

oc 1	Recognize how apply updated and latest trends in wind turbine technology
oc 2	Produce and prepare knowledge on methods and approaches of site selection for wind turbines
oc 3	Explain how to get knowledge on aspects of Wind turbines Project Planning & Structuring including issues on bankability and risk-mitigation

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

LO1	Identifies the basic definitions (power curve, overall efficiency, Betz limit, stall and pitch regulation, etc.),
LO2	Display the basic concepts as power in the wind, vertical distribution of wind speeds, power production and efficiency of a wind turbine, energy yield of a wind turbine from a certain site.
LO3	Differentiate between four main wind turbine design concepts, main differences, advantages, disadvantages.
LO4	Demonstrate the basic concepts from grid integration of wind turbines (voltage at the connection point, active, reactive power, strength of the grid, power quality of a wind turbine).

b. Psychomotor Domains (LOs):

LO5	Prepare and present some effects that wind power has on power system operation and grid investments, describe operation of hybrid systems (wind/diesel, wind/battery/diesel),
LO6	Apply knowledge to show effects that wind power has on environment, analyze and compare characteristics of different wind turbines, present some control possibilities of wind turbines, analyze wind conditions, and wind farm layout possibilities of the particular site.
LO7	Conduct and develop to calculate energy yield of a wind turbine from a certain site using actual measurements or approximate data, perform basic calculations and analysis for grid connection of a wind turbine.
LO8	Use the tool to describe main aspects treated in the Grid Codes for connection of wind turbines and explain why those aspects are importan

c. Affective Domains (LOs):

-	None

4- Program LOs served by the course:

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

Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.

5- The relation between the course learning outcomes and the program LOs

Course (LOs)		program LOs	
LO1	Identifies the basic definitions (power curve, overall efficiency, Betz limit, stall and pitch regulation, etc.),	Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
LO2	Display the basic concepts as power in the wind, vertical distribution of wind speeds, power production and efficiency of a wind turbine, energy yield of a wind turbine from a certain site.	Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
LO3	Differentiate between four main wind turbine design concepts, main differences, advantages, disadvantages.	Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
LO4	Demonstrate the basic concepts from grid integration of wind turbines (voltage at the connection point, active, reactive power, strength of the grid, power quality of a wind turbine).	Lo18.	identify the principles of performing electrical system calculations, including load flow, earthling, and equipment sizing.
LO5	Prepare and present some effects that wind power has on power system operation and grid investments, describe operation of hybrid systems (wind/diesel, wind/battery/diesel),	Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.
LO6	Apply knowledge to show effects that wind power has on environment, analyze and compare characteristics of different wind turbines, present some control possibilities of wind turbines, analyze wind conditions, and wind farm layout possibilities	Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.

	of the particular site.		
LO7	Conduct and develop to calculate energy yield of a wind turbine from a certain site using actual measurements or approximate data, perform basic calculations and analysis for grid connection of a wind turbine.	Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.
LO8	Use the tool to describe main aspects treated in the Grid Codes for connection of wind turbines and explain why those aspects are importan	Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.

6- 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: Wind energy technology covers many technological aspects, like aerodynamics, mechanics, physics, and electrical engineering.	2	2	2	LO1
2	The physical power in the wind, the historical development	2	2	2	LO2
3	wind turbine design concepts	2	2	2	LO3
4	Quiz (1)	2	2	2	LO4
5	Focuses on environmental impact of wind	2	2	2	LO5
6	turbines, economics	2	2	2	LO5
7	Focuses on network integration	2	2	2	LO6
8	Midterm		1.0		
9	Focuses on Relative Wind Speed	2	2	2	LO6
10	Focuses on Coefficient of performance for Wind energy	2	2	2	LO6
11	Focuses on Tip-Speed ratio.	2	2	2	LO6
12	Quiz (2) + Regions of operation	2	2	2	LO6

13	Focuses on Overview of Wind Turbines, Alignment of Rotating Axis.	2	2	2	LO7
14	Focuses on Speed of Rotation	2	2	2	LO7
15	Focuses on Assessment of FSWT and VSWT, Power Conversion, Control Actions	2	2	2	LO8
16	Final Exam		2.0		
Total hours		28	28	28	--

7- 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 / self learning	Site visit	Reports/ researches	Cooperative work	presentation	Discussion	modelling
Lo1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo7	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo8	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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.

8- 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
Lo1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lo8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

b- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations		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 (7)
final exam		Week (14)

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

9- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	▪ Wind Energy Explained: Theory, Design, and Application, By James F. Manwell, Jon G. McGowan, and Anthony L. Rogers, Wiley; 2 edition (February 2010) ▪ Wind Power Plants: Fundamentals, Design, Construction and Operation, Gasch, Robert, Twele, Jochen (Eds.) Springer-Verlag Berlin Heidelberg; 2 edition (2012)
c) Recommend books	Mentioned at time.
d) Periodicals, Web sites, etc	No periodicals are needed.

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 assignments

Course coordinator:	Dr. Sabah Ibrahim Muhammad
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem
Date:	2023/2024

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

Course specification

Course code:	Course name
CECE 491	Senior Project 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	2023-2024

B-Basic Information

Title	Senior Project II
Code	CECE 491
level courses	Fifth level courses (Senior -2)-Second semester (Spring)
Credit Hours	2Cr. hr
Lectures	1hr
Tutorial	0hr
Lab	3hr
Total	4hr
Prerequisite	CECE 490
Instructor name/Email	Dr. Abdallah Reda El-Sayed Eissa

C- Professional information

1- Course core

Participating students carry on the plan of work they developed in CECE 490. Each participant gives an oral presentation of his/her results. On the approval of the supervisor, each group prepares and presents a complete package. Further ethical issues of the computing profession are covered and emphasized all over the course work

2- Course learning objectives:

oc 1	Explain the principle of power system and to provide them with in depth knowledge of the distribution system.
oc 2	Recognize how cover types of distribution systems and networks, load characteristics and voltage levels
oc 3	Explain the principle of of distribution systems planning and design. Particular attention will be given to the issue of industrial medium voltage distribution systems through case studies, practical design assignments and design verification using power system analysis software.
oc 4	Recognize the solar energy systems and linking them to the project.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

-	None

b. Psychomotor Domains (LOs):

LO1	Apply knowledge to explain power system construction, function, voltage levels and load characteristics basic definitions and relevant equations.
LO2	Prepare and present the principals of designing distribution systems consisting of dynamic and static loads.

c. Affective Domains (LOs):

LO3	Explain the heighten awareness of distribution systems performance
LO4	Communicate effectively with analyzing load flow, short circuits results for distribution systems using power system analysis packages.
LO5	Express the circuits analysis, machine, and power system analyses fundamentals in sizing distribution systems equipment.

4- Program LOs served by the course:

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

Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
Lo30.	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.
Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering
Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

5- The relation between the course learning outcomes and the program LOs

Course (LOs)	program LOs

LO1	Apply knowledge to explain power system construction, function, voltage levels and load characteristics basic definitions and relevant equations.	Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
		Lo30.	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
		Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.
LO2	Prepare and present the principals of designing distribution systems consisting of dynamic and static loads.	Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
		Lo30.	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
		Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.
LO3	Explain the heighten awareness of distribution systems performance	Lo39.	Show accuracy while Designing experiments, as well as analyzing and interpreting experimental results related to electrical and electrical power systems.
LO4	Communicate effectively with analyzing load flow, short circuits results for distribution systems using power system analysis packages.	Lo40	Apply modern techniques, skills and engineering tools to electrical power engineering

LO5	Express the circuits analysis, machine, and power system analyses fundamentals in sizing distribution systems equipment.	Lo41	Work professionally in multidisciplinary concepts by integrating Electrical power Engineering with Internet of Things

6- 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	HVAC, Types of HVAC systems, Chiller system, Firefighting, Basic components of a fire alarm system, Water pumps, Improving power factor	1	0	3	LO1
2	Fixed capacitors, Automatic capacitors bank, Distribution Board Design, Normal Power Distribution Board,	1	0	3	LO2
3	Emergency Power Distribution Board, Medium Voltage Switchgear (MVSG), Ring Main Unit (RMU).	1	0	3	LO3
4	Project progress seminar (4)	1	0	3	LO3
5	PV System:	1	0	3	LO4
6	Inverter Sizing, Battery Sizing, Solar Charger Sizing, …etc.	1	0	3	LO5
7	Project progress seminar (5)	1	0	3	LO5
8	Midterm- Break				
9	Solar Tracking System	1	0	3	LO2
10	Actuator Types, Axis of Rotation	1	0	3	LO3
11	Software & hardware, Solar sensor, …etc.	1	0	3	LO5
12	Project progress seminar (6)	1	0	3	LO4
13	Web Application	1	0	3	LO5
14	MERN technology, User and Company Registration, Purpose, and Functionality of PVHOME, …etc.	1	0	3	LO5
15	Writing project final report	1	0	3	LO3
16	Final Exam		2.0		
Total hours		14	0	42	--

7- 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
Lo1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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.

8- Student assessment method

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

Course lLOs	Tools of assessment											
	quizzes	Mid -term exam	Final exam	sheets/ sketches	projects	Practical: lab	Oral exam	discussions	Reports/ researches	presentation	modelling	
Lo1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

e- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)

Discussions	Every week for any student
Presentations	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 (7)
final exam	Week (14)

f- Grading system

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

9- List of references:

a) Course notes	Lecture notes and handouts
b) Required books	▪ Egyptian Code & Regulations. ▪ Philips Lighting catalogue. ▪ Grounding and bounding electrical system book. ▪ Dr. Gilany Electrical design book. ▪ Schneider Electric Sockets Catalogue. ▪ Schneider circuit breaker catalogue
c) Recommend books	None
d) Periodicals, Web sites, etc	No periodicals are needed.

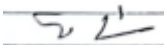
10- Facilities required for teaching and learning:

- 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 assignments

Course coordinator:	Dr. Abdallah Reda El-Sayed Eissa	
program Coordinator	Dr. Ehab Mohamed Nabil Ismail Abdel Rasoul	Ehab
Head of the Department	Dr. Ibrahim Ali Mahmoud Abdel Dayem	
Date:	2023/2024	

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

Course specification

Course code:	Course name
CECE 424	Control System
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	2023-2024

B-Basic Information

Title	Control System
Code	CECE 424
level courses	Fifth level courses (Senior -2)-Second semester (Spring)
Credit Hours	3Cr. hr
Lectures	2hr
Tutorial	2hr
Lab	0hr
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

Covers state-space modeling and analysis, controllability, observability, state feedback design and pole placement, dynamic observers, output feedback design and stability analysis

2- Course learning objectives:

oc 1	Recognize the knowledge about the fundamentals of digital control systems.
oc 2	That the student gets used to analyse and design digital control systems
oc 3	Explain the principle of the performance of digital control systems.
oc 4	Able to understand explain the fundamentals of z-transform technique and digital control systems.
oc 5	Recognize how demonstrate the principles of stability analysis and steady-state errors of digital control systems.
oc 6	Recognize how Design and analyze the performance of digital control systems

oc 7	Explain how to get the stability test of digital control systems.

3- Learning outcomes of the course (LOs)

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

a. Cognitive Domains (LOs):

LO1	Identifies the basic about State space modelling & analysis
LO2	Display the basic for the Controllability & observability
LO3	Demonstrate the State feedback & pole placement

b. Psychomotor Domains (LOs):

LO4	Prepare and present knowledge of Dynamics Observers
LO5	Conduct and develop knowledge of INTEGRATED FULL-STATE FEEDBACK AND OBSERVER
LO6	Use the tool to enrich knowledge of Reduced Order Observer
LO7	Generate the design of Optimal LQR (Linear Quadrature Regulator)
LO8	Apply knowledge to check the Lyapunov Stability

c. Affective Domains (LOs):

-	None

4- Program LOs served by the course:

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

Lo11.	Principles of for electrical equipment and systems.
Lo12.	Principles of operation and performance specifications of electrical and electromechanical engineering systems .
Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
Lo30.	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.

5- The relation between the course learning outcomes and the program LOs

Course (LOs)		program LOs	
LO1	Identifies the basic about State	Lo11.	Principles of for electrical equipment and systems.

	space modelling & analysis	Lo12.	Principles of operation and performance specifications of electrical and electromechanical engineering systems .
LO2	Display the basic for the Controllability & observability	Lo12.	Principles of operation and performance specifications of electrical and electromechanical engineering systems .
LO3	Demonstrate the State feedback & pole placement	Lo11. Lo12.	Principles of for electrical equipment and systems. Principles of operation and performance specifications of electrical and electromechanical engineering systems .
LO4	Prepare and present knowledge of Dynamics Observers	Lo19. Lo30.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering. Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
LO5	Conduct and develop knowledge of INTEGRATED FULL-STATE FEEDBACK AND OBSERVER	Lo19.	Solve complex engineering problems and solve problems in the field of electrical and electrical power engineering.
LO6	Use the tool to enrich knowledge of Reduced Order Observer	Lo29.	Utilize computer program to analyze design problems and interpret numerical data and test and examine components, equipment and systems of electrical and electric power generation, control, and distribution systems.
Lo7	Generate the design of Optimal LQR (Linear Quadrature Regulator)	Lo30.	Integrate electrical, electronic, and mechanical components and equipment with transducers, actuators, and controllers in creatively computer-controlled systems.
Lo8	Apply knowledge to check the Lyapunov Stability	Lo31.	To design, simulate and practice the techniques of hardware and software tools in Power systems, Power Electronics and Renewable Energy systems.

6- 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: Mathematical Modelling of	2	2	2	Lo1

	Dynamic Systems				
2	Focuses on Modelling in state space.	2	2	2	LO 1
3	Focuses on State-space representation of dynamic systems.	2	2	2	LO 1
4	Quiz (1) + State-space representations of transfer function systems.	2	2	2	LO 1
5	Focuses on the Controllability & observability	2	2	2	LO 2
6	Focuses on the State feedback & pole placement	2	2	2	LO 3
7	Focuses on the Dynamics Observers	2	2	2	LO 4
8	Midterm		1.0		
9	Focuses on INTEGRATED FULL-STATE FEEDBACK AND OBSERVER	2	2	2	LO 5
10	Focuses on the Reduced Order Observer	2	2	2	LO 6
11	Focuses on the Design of Control Systems in State Space	2	2	2	LO7
12	Design of regulator systems with observers.	2	2	2	LO7
13	Focuses on Design of Control Systems with Observers.	2	2	2	LO7
14	Quiz (2) + Focuses on Optimal LQR (Linear Quadrature Regulator)	2	2	2	LO7
15	Focuses on Lyapunov Stability	2	2	2	LO8
16	Focuses on INTEGRATED FULL-STATE FEEDBACK AND OBSERVER		2.0		
Total hours		28	28	28	--

7- 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

Lo1	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo2	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo3	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo4	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo5	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo6	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo7	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Lo8	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓

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.

8- Student assessment method

d- 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	
Lo1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Lo8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

e- Time schedule of assessment

Quizzes	Quiz (1)	Week (3)
	Quiz (2)	Week (10)
Discussions		Every week for any student
Presentations		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 (7)
final exam		Week (14)

f- 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	Katsuhiko Ogata, "Modern Control Engineering", fourth edition,2002.
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 assignments

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:	2023/2024