Surigao City Campus

Bachelor of Science in Electrical Engineering

SURIGAO STATE COLLEGE OF TECHNOLOGY

SSCT

"For Nation's Greater Heights"

IMPLEMENTATION

I.1. The Dean or official concerned approves the updated syllabus for each subject.

COLLEGE OF ENGINEERING AND INFORMATION TECHNOLOGY
City Campus
SecondSemester, Academic Year 2021-2022

Outcomes Based-Education (OBE) Syllabus in EE 431
Power Systems Analysis
Course Credit: 4.0 units **(108hrs)**

Institutional Vision, Mission, and Goals

Vision:
An innovative and technologically-advanced State College in Caraga.

Mission:
To provide relevant,

a. high quality and sustainable instruction,
b. research, production and extension programs and
c. services within a culture of credible and responsive institutional governance.

Goals:

1. Foster application of the discipline and provide its learner with industry-based training and education particularly in engineering, technology and fisheries.
2. Conduct and utilize studies for the development of new products, systems and services relevant to Philippine life and of the global village.
3. Promote transfer of technology and spread useful technical skills, thus empowering its learners and their activities.

SSCT Core Values

Service-Oriented **S**ocially Responsive **C**ommitted **T**ransformational

SSCT Quality Policy

Surigao State College of Technology provides quality instruction, research, extension programs and production services to satisfy its customers by responding to their needs and expectations and continually improving its quality management system.

Institutional Graduate Attributes (IGA) :

- Visionary Leader
- Effective Communicator
- Competent Technologist
- Self-Directed Lifelong Learner

Program Goals

The Electrical Engineering program aims to design and apply the generation, transmission, and distribution of electrical energy to produce competent engineers that exhibit positive work ethics and flexibility in work conditions for the development of Caraga.

ProgramEducational Objectives (PEO) and Relationship to Institutional Mission

Program Educational Objectives (PEO)	Mission		
	a	b	c
EE-PEO1. Demonstrate professionalism in electrical engineering and apply professional ethics thru communication and collaboration.	/	/	/
EE-PEO2. Use appropriate techniques, resources, and modern tools necessary for analysis, design, and modeling of complex electrical systems	/	/	/
EE-PEO3. Plan, lead, and implement designated tasks, interact with other engineering professionals, and take leadership roles in electrical engineering organization.	/	/	/
EE-PEO4. Engage in lifelong learning able to discover new opportunities for continuing personal and professional development in electrical engineering	/	/	/

Program Outcomes (PO) and Relationship to Program Educational Objectives (PEO)

Program Outcomes (PO)	Program Educational Objectives (PEO)			
	1	2	3	4
EE-POa.Apply knowledge of mathematics and sciences to solve complex engineering problems				
EE-POb.Develop and conduct appropriate experimentation, analyze and interpret data				
EE-POc.Design a system, component, or process to meet desired needs within	/	/	/	/

realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, in accordance with standards				
EE-POd.Function effectively on multi-disciplinary and multi-cultural teams that establish goals, plan tasks, and meet deadlines				
EE-POe.Identify, formulate, and solve complex problems in electrical engineering	/	/	/	/
EE-POf.Recognize ethical and professional responsibilities in engineering practice				
EE-POg.Communicate effectively with a range of audiences	/	/	/	/
EE-POh.Understand the impact of engineering solutions in a global, economic, environmental, and societal context				
EE-POi.Recognize the need for additional knowledge and engage in lifelong learning				
EE-POj.Articulate and discuss the latest developments in the field of electrical engineering	/	/	/	/
EE-POk.Apply techniques, skills, and modern engineering tools necessary for electrical engineering practice	/	/	/	/
EE-POl.Demonstrate knowledge and understanding of engineering and management principles as a member and/or leader in a team to manage projects in multidisciplinary environments				

Course Description

This course deals with the study on the basic structure of power systems, recent trends and innovations in power systems, transmission line parameters, network modeling and calculations, load flow studies, short circuit calculations and use of computer software for simulation.

DACUM Main Duties (DMD)

EE-DMD1. Diagnose electrical problems using the electrical diagrams or blue print (as built electrical plans)
EE-DMD2. Install, repair, and maintenance electrical power systems(building wiring, controls, electrical machines and transformers)
EE-DMD3. Facilities Manager
EE-DMD4. Power Plant Manager
EE-DMD5. Electrical Researchers, Professor and Faculty

Course Outcomes (CO) and Relationship to Program Outcomes (PO)

Program Outcome (PO) /Level	Course Outcomes (CO)	Assessment Task (CO-AT)	DACUM Links				
			1	2	3	4	5
EE-POc(Enabling).Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, in accordance with standards.	*EE431-CO1*: Design and Create computational models for analysis power systems and able to understand per unit system.	Students conduct electrical engineering simulations. These simulations serve as a group activity where they will analyze and design a power system. Criteria – Functionality and lab report Total Points: 100 points	/		/	/	/
EE-POe(Enabling). Identify, formulate, and solve complex problems in electrical engineering.	*EE431-CO2*: Calculate complex electrical engineering problems related to mathematical description and use of symmetrical component theory.	Students calculate sets of electrical engineering problems using the mathematical description of symmetrical component theory. Criteria – 70% correct answers and solutions Total Points: 100 points	/				/
EE-POg(Enabling).Communicate effectively with a range of audiences	*EE431-CO3*: Communicate effectively with the team, group or other range of audiences when conducting reports and presentations.	Students create a design and present them in the class. Criteria – creativity, functionality, delivery Total Points: 100 points			/	/	/
EE-POj.(Enabling).Articulate and discuss the latest developments in the field of	*EE431-CO4*:Discuss and articulate with the team or group the latest	Students present and discuss the power system design.			/	/	/

electrical engineering	developments in the power system.	Criteria - functionality and delivery Total Points: 100 points					
EE-POk.(Demonstrates). Apply techniques, skills, and modern engineering tools necessary for electrical engineering practice	*EE431-CO5*:Apply simulation tools to perform comprehensive short circuit studies, load flow studies, and optimal power flow studies.	Students conduct electrical engineering simulations. These simulations serve as a group activity where they will analyze and design a power system. Criteria – Functionality and lab report Total Points: 100 points	/		/	/	/

Course Outcomes (CO) and Relationship to Intended Learning Outcomes (ILO)

Course Outcomes (CO)	Intended Learning Outcomes (ILO)
EE431-CO1: Design and Create computational models for analysis power systems and able to understand per unit system. *EE431-CO2*: Calculate complex electrical engineering problems related to mathematical description and use of symmetrical component theory. *EE431-CO3*: Communicate effectively with the team, group or other range of audiences when conducting reports and presentations. *EE431-CO4*:Discuss and articulate with the team or group the latest developments in the power	*EE431-ILO1*: Define the basic concepts of Power system analysis, power system units, and power system elements and calculate problems utilizing these concepts. *EE431-ILO2*: Analyze power system operation and stability control. *EE431-ILO3*: Apply modelling of generators, transformers, lines and cables in positive, negative, and zero sequence systems. *EE431-ILO4*: Analyze and use power system models based on nodal admittance and impedance matrices for the analysis of large-scale power networks.

system *EE431-CO5*:Apply simulation tools to perform comprehensive short circuit studies, load flow studies, and optimal power flow studies.	*EE431-ILO5*: Describe the behaviors of inductors and capacitors when combined in parallel and series. *EE431-ILO6*: Understand Positive Sequence, Negative & zero sequence system and fault analysis.

Detailed Course Content

Intended Learning Outcomes (ILO)	Topics	Time Frame	Teaching and Learning Activities(TLA)	Assessment Tasks (ILO-AT)	Target	Resources	Values Integration	Remarks
EE431-ILO1: Define the basic concepts of Power system analysis, power system units, and power system elements and calculate problems utilizing these concepts. (EE431-CO3, EE431-CO4)	**1. Elements of Power System Analysis** *1.1. Fundamentals of Power Systems* *1.2. Line Constants calculation* *1.3. Capacitance of Transmission lines* *1.4. Circuit Elements* *1.5. Applications*	9.0 hrs. lec	Learning Module 1 *Asynchronous*	Problem solving quiz on the elements of power system analysis.	70% of the students shall have a rating of at least 3.0	Modules, e-books, textbooks, and worksheets	Core Value: *Committed* Sub-Value: *Determined in learning the basic concepts of electric circuits*	
EE431-ILO2: Analyze power system operation and stability control. (EE431-CO1, EE431-CO2, EE431-CO5)	**2. Economic operation of power systems** *2.1. Performance of Lines* *2.2. High Voltage DC Transmission* *2.3. Corona*	9.0 hrs.lec/ 10.0 hrs. lab	Learning Module 2 *Asynchronous*	Problem solving quiz on the Economic operation of power system.	70% of the students shall have a rating of at least 3.0	Videos online, modules, e-books,Multisim software, and worksheets	Core Value: *Committed* Sub-Value: *Determined in learning the basic laws to solve basic electric circuits*	

EE431-ILO3: Apply modelling of generators, transformers, lines and cables in positive, negative, and zero sequence systems. (EE431-CO1, EE431-CO2, EE431-CO5)	**3. Modelling power system components** *3.1. Mechanical Design of Transmission Lines* *3.2. Overhead Line Insulators* *3.3. Insulated Cables*	9.0 hrs.lec./ 15.0 hrs. lab	Learning Module 3 *Asynchronous*	Designing a power system models.	70% of the students shall have a rating of at least 3.0	Videos online, modules, e-books,Multisim software, and worksheets	Core Value: *Committed* Sub-Value: *Dedicated in solving linear electrical circuits using nodal and mesh analysis*	
MIDTERM EXAMINATION– 2.0 Hrs.								
EE431-ILO4: Analyze and use power system models based on nodal admittance and impedance matrices for the analysis of large-scale power networks. (EE431-CO1, EE431-CO2, EE431-CO5)	**4. Load flow analysis** *4.1. Voltage Control* *4.2. Neutral Grounding* *4.3. Transients in Power System*	8.0 hrs.lec / 10.0 hrs. lab	Learning Module 4 *Asynchronous*	Problem solving quiz on the load flow in the power system.	70% of the students shall have a rating of at least 3.0	Videos online, modules, e-books,Multisim software, and worksheets	Core Value: *Committed* Sub-Value: *Perseverant in learning new concepts*	
EE431-ILO5: Understand Positive Sequence, Negative & zero sequence system and fault analysis.(EE431-CO1, EE431-CO2, EE431-CO5)	**5. Short circuit analysis and calculations** *5.1. Symmetrical Components and Fault Calculations*	8.0 hrs.lec / 10.0 hrs. lab	Learning Module 5 *Asynchronous*	Problem solving quiz on the fault current in the power system.	70% of the students shall have a rating of at least 3.0	Modules, e-books,Multisim software, and worksheets	Core Value: *Transformational* Sub-Value: *Optimistic in analysing first-order RL and RC circuits*	

EE431-ILO6: Recommend what protection device will be used in the power system. (EE431-CO1, EE431-CO2, EE431-CO5)	**6. Power system protection: selection and coordination of protection system** *6.1. Protective relays* *6.2. Circuit Breakers* *6.3. Insulation Coordination and Overvoltage Protection*	7.0 hrs.lec / 5.0 hrs. lab	Learning Module 6 *Asynchronous*	Designing the protection system of a given power system.	70% of the students shall have a rating of at least 3.0	Modules, e-books,Multisim software, and worksheets	Core Value: *Confidence* Sub-Value: ability to communicate effectively to professionals and non-specialists alike through reports and presentations.	
FINAL EXAMINATION – 2.0 Hrs.								

References:

Textbooks
J. Duncan Glover, Mulukutla S. Sarma& Thomas J. Overbye (2016), Power System Analysis & Design, 5th ed.,
Charles Alexander & Matthew Sadiku (2016).*Fundamentals of Electric Circuits*.6th ed. McGraw-Hill Education
William H. Hayt, Jr. et. al(2012).*Engineering Circuit Analysis*.8th ed.McGraw-Hill

Course Requirements:

- Laboratory Reports(CO-AT1)
- Problem Sets(CO-AT2)
- Group Project(CO-AT3)
- Quizzes and Assignments
- Midterm and Final exams

Course Evaluation:

Criteria Lecture Grade

- Quizzesand online outputs/interaction (ILO-AT) 20%
- Performance Tasks (CO-AT) 40%
- Major Exams (Midterm and Final) 40%

TOTAL 100%

Grade Computation: $\frac{Midterm\ Grade + Final\ Grade}{2} = Average\ Grade$

Grade Point	Description
1.0	Excellent
1.5 – 1.1	Very Good
2.0 – 1.6	Highly Satisfactory
2.5 – 2.1	Good
2.9 – 2.6	Satisfactory
3.0	Passing
5.0	Failed due to poor performance, absences, withdrawal without notice
DRP	Dropped with approved dropping slip
INC	Incomplete requirements but w/ passing class standing. INC is for non-graduating students only
NG	No Grade

Source: *SSCT Student Handbook*

Course Policies:

1. Attendance shall be checked in every class session in the Google Meet. This is to monitor the absences incurred by the students in terms of the allowable number of absences for a course as stipulated in the Student Handbook.
2. During online classes, video camera shall be turned on all the time and microphone shall be turned off. The microphone shall be unmuted only if the student's name is called to participate in class discussion.
3. Major examinations in multiple-choice type shall be done online. For problem solving type, detailed solutions shall be written legibly in separate sheets of paper and shall be converted to pdf form prior to submission.
4. Cheating in major examinations which include attempts to defraud, deceive, or mislead the instructor in arriving at an honest assessment shall entail zero score.

5. Plagiarism which is a form of cheating that involves presenting the ideas or work of another as one's own work shall entail zero score.
6. Projects shall be submitted on or before the deadline. Students who submit unsatisfactory projects shall be given the chance to improve their works on the condition that they resubmit the revised outputs on the date set by the instructor. Non-submission of a project on the deadline shall entail zero score.
7. An INC grade shall be given to students who fail to submit the course requirements of at least 95% of the projects and quizzes or failure to take the major examinations.

Revision History:

Revision No.	Revised by	Date of Revision	Date of Implementation	Highlight of Revision
1	Engr. Vernon V. Liza	August 2019	August 2019	Followed OBTL Format as per CMO #101 S. 2017
2	Engr. Andy Bong F. Navarro	July 19, 2021	August 23, 2021	DACUM Workshop vis-à-vis CMO No. 101 S. 2017

Prepared by:

ENGR. ANDY BONG F. NAVARRO
Guest Lecturer

Date: 1-25-2022

Checked and reviewed by:

ENGR. VICENTE Z. DELANTE
Program Chair, BSEE

Date: 1-28-2022

Noted by:

ENGR. ROBERT R. BACARRO, MECE, MBA
Dean, COLLEGE

Date: 1-28-2022

Recommended by:

RONITA E. TALINGTING, PhD
Campus Director

Date: 1-31-2022

Approved by:

EMMYLOU A. BORJA, EdD
VP for Academic Affairs

Date: 1-31-2022

08/18/21 - 01

Republic of the Philippines
SURIGAO STATE COLLEGE OF TECHNOLOGY
Narciso Street, Surigao City

"For Nation's Greater Heights"

August 18, 2021

DR. GREGORIO Z. GAMBOA, JR.
SUC President III
Surigao State College of Technology
Surigao City

SSCT SURIGAO CITY
RECEIVED
DATE: 8/18/21 @ 9:18AM
NAME:

Sir:

Warm Greeting of Peace!

The conduct of "Workshop on OBE Syllabi Enhancement" was scheduled last August 3-6, 2021. However, the activity was postponed due to the Pre-Validation for Universityhood conducted by CHED Caraga and OIQAG last August 11, 2021.

Relative to this, the undersigned would like to seek approval from your end to re-schedule the workshop following the stipulated schedule below:

August 24-25, 2021 - College of Engineering (CEIT) and College of Technology (COT)

August 26-27, 2021- College of Teacher Education (CTE), College of Arts and Sciences
(CAS) and Graduate School (GS)

Further, the undersigned would like to request that a memorandum shall be issued by your office indicating the new aforementioned schedule.

Deeply looking forward to your positive response on this request.

Thank you very much

Respectfully,

EMMYLOU A. BORJA, EdD
VP-Academic Affairs

Approved:

GREGORIO Z. GAMBOA, JR. EdD
SUC President III

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Republic of the Philippines
SURIGAO STATE COLLEGE OF TECHNOLOGY
Narciso Street, Surigao City

MEMORANDUM

RELEASED
DATE: 8/20/21 (3:21PM)
NAME:

REFERENCE NO.	:	SSCT - ADMIN–08-55, Series 2021
DATE	:	AUGUST 19, 2021
TO	:	(Please see attached file)
FROM	:	**The COLLEGE PRESIDENT**
SUBJECT	:	ATTENDANCE TO A 4-DAY WORKSHOP ON SYLLABI EHNANCEMENT FOR THE 1ST SEMESTER OF AY 2021-2022 AT THE SSCT, LEARNING RESOURCE CENTER ON AUGUST 24 TO 27, 2021

Per approved request by Dr. Emmylou A. Borja, Vice President for Academic Affairs, you are hereby directed to participate on the aforementioned workshop on the following schedule.

- August 24-25 2021 – College of Engineering and Information Technology (CEIT) and College of Technology (COT)
- August 26-27, 2021 – College of Teacher Education (CTE), College of Arts and Sciences (CAS) and Graduate School (GS)

Expenses incident for external attendees will be charged against local school funds subject to usual accounting and auditing rules & regulations.

Please be guided accordingly.

GREGORIO Z. GAMBOA, Jr., Ed.D.
SUC President III

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REFERENCE NO. : SSCT - ADMIN–08-55, Series 2021

Workshop on Revision of Course Syllabi

College of Engineering and Information Technology (CEIT) and College of Technology (COT)- **August 24-25, 2021**

CEIT (Across Campuses)

1. Engr. Ingrid Escabal
2. Engr. Darwin C. Mangca
3. Engr. Gracechell M. Pascua
4. Engr. Robert R. Bacarro
5. Dr. Virnille C. Francisco
6. Dr. Jessica Rose E. Fernandez
7. Archt. Lufre Potente
8. Archt. Marlon C. Solloso
9. Engr. Ritchie A. Reyna
10. Engr. Perfecto R. Ruaya, Jr.
11. Engr. Aldrich B. Calinawan
12. Dr. Froilan Jay E. Guiral
13. Mr. Chrysler Van D. Conde
14. Shem L. Gonzales
15. Mr. Elwin S. Argana
16. Dr. Romy Jun A. Sunico
17. Mr. Rex C. Legaspi
18. Dr. Vrian Jay V. Ylaya
19. Ms. Alma Christie C. Reyna
20. Ms. Jovie M. Gallera
21. Engr. Federico A. Aves
22. Dr. Jerry I. Teleron
23. Engr. Vincente Z. Delante
24. Dr. Amor C. Montejo
25. Dr. Aurea M. Madelo
26. Dr. Analyn S. Morite
27. Dr. Rosanne E. Andaluz
28. Dr. Unife O. Cagas
29. Dr. Alex E. Alvarez
30. Dr. Monalee A. Dela Cerna
31. Engr. Richard A. Badiola
32. Engr. Levi A. Corvera
33. Engr. Virne P. Portugues
34. Engr. Josephine V. Acido
35. Engr, Baldapan, Joselito S.
36. Engr. Lucilyn C. Borja
37. Engr. Conrado Jr. B. Delosa
38. Mr. Trashy P. Dumaicos
39. Mr. Crispin P. Noguerra
40. Dr. Teresita L. Toledo
41. Mr. Renz M. Buctuan

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