Surigao City Campus

Bachelor of Science in Electrical Engineering

SURIGAO STATE COLLEGE OF TECHNOLOGY

SSCT

"For Nation's Greater Heights"

I.3. Assignments are designed to reinforce teaching which results to student's maximum learning.

ANNEX III – SAMPLE COURSE SPECIFICATIONS

Bachelor of Science in Electrical Engineering

Table of Contents

TECHNICAL COURSES

	b. General mesh analysis 3. Circuit Analysis Techniques a. Linearity and superposition b. Source transformation c. Thevenin and Norton equivalent circuits d. Maximum power transfer e. Delta-wye conversion f. Circuits with controlled sources and the ideal op amp 4. Characteristics of Energy-storing Elements a. Capacitors and capacitance b. Inductors and inductance 5. Analysis of RL and RC Circuits a. Source-free RL and RC circuits b. Driven RL and RC circuits 6. Analysis of RLC circuits a. Source-free series and parallel RLC circuits b. Complete response of RLC circuits 7. Sinusoidal Steady-state Analysis in the Frequency Domain a. The phasor concept and phasor diagram b. Concept of Impedance and admittance c. Nodal and mesh analysis
Laboratory Equipment	Refer to Annex IV-B – Recommended Laboratory Requirements

Course Name	**ELECTRICAL CIRCUITS 2**
Course Description	The course deals with sinusoidal steady-state analysis in the frequency domain; AC circuit power analysis; analysis of polyphase circuits and magnetically-coupled circuits; frequency response; per unit system and symmetrical components; and two-port networks
Number of Units for Lecture and Laboratory	3 units lecture; 1 unit laboratory
Number of Contact Hours Per Week	3 hours lecture; 3 hours lab
Prerequisite	Electrical Circuits 1
Program Outcomes	To be determined by the program
Course Outcomes	To be determined by the program
Course Outline	1. Sinusoidal Steady-state Analysis in the Frequency Domain a. Nodal and mesh analysis b. Superposition, Thevenin's and Norton's theorems 2. AC circuit power analysis a. Average power b. Apparent power c. Power factor and power factor correction d. Maximum power transfer principle 3. Analysis of Polyphase Circuits a. 3-phase, 3-wire systems b. 3-phase, 4-wire systems

	c. *Power measurement in 3-phase systems* d. *Unbalanced loading in 3-phase systems* 4. *Analysis of Magnetically-coupled Circuits* a. *Mutual inductance* b. *Energy considerations* c. *Analysis of circuits with magnetically-coupled coils* d. *The ideal transformer* 5. *Frequency Response* a. *Parallel resonance* b. *Series resonance* c. *Basic filter design* 6. *Per Unit System* 7. *Symmetrical Components of Unbalanced 3-phase Voltages and Currents* 8. *Analysis of Two-port Networks* a. *Network parameters* b. *Network responses* c. *Network interconnection*
Laboratory Equipment	*Refer to Annex IV-B – Recommended Laboratory Requirements*

Course Name	***ELECTRICAL APPARATUS AND DEVICES***
Course Description	*This course provides characteristics, principle of operation, and applications of single-phase and three-phase transformers, and protective devices such as fuses and circuit breakers. It includes various types of transformers based on different criteria, types of fuses and circuit breakers, parallel operation of transformers, and standard ratings.*
Number of Units for Lecture and Laboratory	*2 units lecture; 1 unit laboratory*
Number of Contact Hours Per Week	*2 hours lecture; 3 hours laboratory*
Prerequisite	*Electrical Circuits 2*
Program Outcomes	*To be identified by the program*
Course Outcomes	*To be identified by the program*

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

Outcomes Based-Education (OBE) Syllabus in EE 202
ELECTRICAL CIRCUITS 2
Course Credit: 4.0unitslec.(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 Socially Responsive Committed Transformational

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 modelling 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

The course deals with sinusoidal steady-state analysis in the frequency domain; AC circuit power analysis; analysis of polyphase circuits and magnetically-coupled circuits; frequency response; per unit system and symmetrical components; and two-port networks

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-POb(Enabling).Develop and conduct appropriate experimentation, analyze and interpret data	*EE201-CO1*: Develop and conduct electrical engineering experimentations and then analyze and interpret the data.	Students conduct electrical engineering experiments. These experiments serve as a group activity where they will analyze and interpret data. Criteria – Functionality and lab report Total Points: 100 points	/	/			/
EE-POe(Enabling). Identify, formulate, and solve complex problems in electrical engineering.	*EE201-CO2*: Calculate complex electrical engineering problems related to electric circuit theory.	Students calculate sets of electrical engineering problems using the electric circuit theory concepts. Criteria – 70% correct answers and solutions Total Points: 100 points	/				/
EE-POg(Enabling).Communicate effectively with a range of audiences	*EE201-CO3*: Communicate effectively with the team, group or other range of audiences when conducting experiments and solving problems in electrical engineering.	Students create a group project and present them in the class. Criteria – creativity, functionality, delivery Total Points: 100 points			/	/	/

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

Course Outcomes (CO)	Intended Learning Outcomes (ILO)
EE201-CO1: Develop and conduct electrical engineering experimentations and then analyze	*EE202-ILO1*: Apply the circuit theorems and techniques used in DC to analyse AC circuits.(EE201-CO2)

and interpret the data. *EE201-CO2*: Calculate complex electrical engineering problems related to electric circuit theory. *EE201-CO3*: Communicate effectively with the team, group or other range of audiences when conducting experiments and solving problems in electrical engineering.	*EE202-ILO2*: Recognize the essential concepts used in AC power analysis. (EE201-CO1) *EE202-ILO3*: Calculate electrical engineering problems related to AC power analysis. (EE201-CO2) *EE202-ILO4*: Analyse balanced and unbalanced three-phase circuits. (EE201-CO1) *EE202-ILO5*: Analyse magnetically coupled circuits. (EE201-CO1) *EE202-ILO6*: Analyse the concepts of transfer function, series and parallel resonance, and basic filter design. (EE201-CO1) *EE202-ILO7*: Recognize the concept of per-unit and understand its significance in power system analysis. (EE201-CO2) *EE202-ILO8*: Recognize the concept of symmetrical components in the analysis of unbalanced three-phase power system. (EE201-CO2) *EE202-ILO9*: Recognize the various two-port parameters to analyse electrical/electronic circuits. (EE201-CO3)

Detailed Course Content

Intended Learning Outcomes (ILO)	Topics	Time Frame	Teaching and Learning Activities(TLA)	Assessment Tasks (ILO-AT)	Target	Resources	Values Integration	Remarks
EE202-ILO1: Apply the circuit theorems and techniques used in DC	**1. SINUSOIDAL STEADY-STATE ANALYSIS**	10 hrs.	Learning Module 1 *Asynchronous*	Problem analysis quiz and assignment	70% of the students shall have	Learning module and videos on	Core Value: *Transformational*	

to analyse AC circuits.(EE201-CO2)	*1.1. Nodal and Mesh Analysis* *1.1.1 Nodal Analysis* *1.1.2 Mesh Analysis* *1.2. Superposition Theorem* *1.3. Source Transformation* *1.4. Thevenin's and Norton's Theorems*			on sinusoidal steady-state analysis.	a rating of at least 3.0	sinusoidal steady-state analysis Multisim	Sub-Value: *Adaptive application of circuit techniques and theorems to analyse ac circuits*	
EE202-ILO2: Recognize the essential concepts used in AC power analysis.(EE201-CO1) *EE202-ILO3*: Calculate electrical engineering problems related to AC power analysis.(EE201-CO2)	**2. AC POWER ANALYSIS** *2.1. Instantaneous and Average Power* *2.2. Maximum Average Power Transfer* *2.3. Effective or RMS Value* *2.4. Apparent Power and Power Factor* *2.5. Complex Power* *2.6. Conservation of AC Power* *2.7. Power Factor Correction*	14 hrs.	Learning Module 2 *Asynchronous*	Problem analysis quiz and assignment on ac power analysis.	70% of the students shall have a rating of at least 3.0	Learning module and videos on ac power analysis Multisim	Core Value: *Committed* Sub-Value: *Dedicated analysis of ac power*	
EE202-ILO4: Analyse	**3. ANALYSIS OF**	14 hrs.	Learning Module 3	Problem	70% of the	Learning	Core Value:	

balanced and unbalanced three-phase circuits.(EE201-CO1)	**POLYPHASE CIRCUITS** *3.1. Balanced Three-Phase Voltages* *3.2. Balanced Wye-Wye Connection* *3.3. Balanced Wye-Delta Connection* *3.4. Balanced Delta-Delta Connection* *3.5. Balanced Delta-Wye Connection* *3.6. Power in a Balanced System* *3.7. Unbalanced Three-Phase Systems* *3.8. Three-Phase Power Measurement*		*Asynchronous*	analysis quiz and assignment on three-phase circuits	students shall have a rating of at least 3.0	module and videos on the analysis of polyphase circuits Multisim	*Committed* Sub-Value: *Perseverant in the analysis of polyphase circuits*	
EE202-ILO5: Analyse magnetically coupled circuits.(EE201-CO1)	**4. ANALYSIS OF MAGNETICALLY-COUPLED CIRCUITS** *4.1. Mutual Inductance* *4.2. Energy in a Coupled Circuit* *4.3. Linear Transformers* *4.4. Ideal*	12 hrs.	Learning Module 4 *Asynchronous*	Problem analysis quiz and assignment on magnetically-coupled circuits	70% of the students shall have a rating of at least 3.0	Learning module and videos on the analysis of magnetically-coupled circuits. Multisim	Core Value: *Transformational* Sub-Value: *Adaptive application of mutual inductance in the analysis of magnetically-coupled circuits*	

	4.5. *Transformers Ideal Autotransformers*							
MIDTERM EXAMINATION– 2.0 Hrs.								
EE202-ILO6: Analyse the concepts of transfer function, series and parallel resonance, and basic filter design.(EE201-CO1)	**5. FREQUENCY RESPONSE** 5.1. *Transfer Function* 5.2. *Series Resonance* 5.3. *Parallel Resonance* 5.4. *Basic Filter Design*	10 hrs.	Learning Module 5 *Asynchronous*	Problem analysis quiz on frequency response	70% of the students shall have a rating of at least 3.0	Learning module and videos on frequency response	Core Value: *Committed* Sub-Value: *Determined analysis of the frequency response of electrical circuits*	
EE202-ILO7: Recognize the concept of per-unit and understand its significance in power system analysis.(EE201-CO2)	**6. PER UNIT SYSTEM** 6.1. *Single-Phase Systems* 6.2. *Change of Base* 6.3. *Three-Phase Systems*	14 hrs.	Learning Module 6 *Asynchronous*	Problem analysis quiz and assignment on per-unit system	70% of the students shall have a rating of at least 3.0	Learning module and videos on per-unit system	Core Value: *Transformational* Sub-Value: *Optimistic application of per unit system in the analysis of power systems*	
EE202-ILO8: Recognize the concept of symmetrical components in the analysis of unbalanced three-phase power system.(EE201-CO2)	**7. SYMMETRICAL COMPONENTS OF UNBALANCED 3-PHASE VOLTAGES AND CURRENTS**	14 hrs.	Learning Module 7 *Asynchronous*	Problem analysis quiz and assignment on symmetrical components	70% of the students shall have a rating of at least 3.0	Learning module and videos symmetrical components.	Core Value: *Transformational* Sub-Value: *Adaptive analysis of unbalanced 3-phase voltages*	

							and currents	
EE202-ILO9: Recognize the various two-port parameters to analyse electrical/electronic circuits.(EE201-CO3)	**8. ANALYSIS OF TWO-PORT NETWORKS** *8.1. Impedance Parameters* *8.2. Admittance Parameters* *8.3. Hybrid Parameters* *8.4. Transmission Parameters* *8.5. Relationships Between Parameters* *8.6. Network Interconnection*	12 hrs.	Learning Module 8 *Asynchronous*	Problem analysis quiz on two-port networks	70% of the students shall have a rating of at least 3.0	Learning module and videos on analysis of two-port networks.	Core Value: *Committed* Sub-Value: *Determined application of two-port networks to analyse electrical circuits*	
FINAL EXAMINATION – 2.0 Hrs.								

References:

Charles Alexander & Matthew Sadiku (2016).*Fundamentals of Electric Circuits*.6th ed. McGraw-Hill Education
HemchandraMadhusudanShertukde (2019). *Power System Analysis Illustrated with MATLAB and ETAP*. CRC Press Taylor and Francis Group
J. Duncan Glover, Thomas J. Overbye, &Mulukutla S. Sarma (2017).*Power System Analysis & Design*. 6th ed. Cengage Learning
Turan Gönen (2014).*Electric Power Distribution Engineering*. 3rd ed. CRC Press, Taylor & Francis Group
MahmoodNahvi, PhD. & Joseph A. Edminister (2017).*Schaum's Outlines of Electric Circuits*. 7thed. McGraw-Hill Education

Course Requirements:

- Laboratory Reports(CO-AT1)
- Portfolio of solved Problems(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	July 19, 2021	August 23, 2021	Followed OBTL Format as per CMO #101 S. 2017
2	Engr. Vernon V. Liza	January 25, 2021	February 7, 2021	DACUM Workshop vis-à-vis CMO No. 101 S. 2017

Prepared by:

ENGR. VERNON V. LIZA
Guest Lecturer

Date: 1-25-2022

Checked and reviewed by:

ENGR. VICENTE Z. DELANTE, MEng'g
Program Chair, BSEE

Date: 1-28-2022

Noted by:

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

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