Surigao City Campus

Bachelor of Science in Electrical Engineering

SURIGAO STATE COLLEGE OF TECHNOLOGY

SSCT

"For Nation's Greater Heights"

I.2. Evaluation tools/instruments are reviewed and revised periodically.

COLLEGE OF ENGINEERING & INFORMATION TECHNOLOGY

OFFICE MEMO

REFERENCE NO.	:	SSCT – CEIT – 08 – 003, S. 2020
DATE	:	AUGUST 28, 2020
TO	:	DR JESSICA ROSE E. FERNANDEZ – Asst Dean, CEIT DR MONALEE A. DELA CERNA – Prog Chair, BSCS ENGR INGRID ESCABAL – Prog Chair, BSEE JOVIE M. GALLERA – Prog Char, BSIS ENGR DARWIN C. MANGCA – Prog Chair, BSECE DR ANALYN S. MORITE – Prog Chair, BSCpE ENGR RICHARD A. BADIOLA – Prog Chair, BSCE ALMA CHRISTIE C. REYNA – Prog Chair, BSIT
FROM	:	ENGR ROBERT R. BACARRO, MECE, MBA Dean, CEIT
SUBJECT	:	**COMMITTEE IN CHECKING THE VALIDITY OF THE TEST QUESTIONNAIRES**

Greetings!

In the exigency of the service, you are hereby designated to a committee to check the validity of the test questionnaires submitted by the faculty. Furthermore, you have to check also the alignment of the test questionnaires to the Table of Specification (TOS).

This committee shall function until the end of the Academic Year 2020 – 2021.

Thank you for your support.

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

Noted by:

DR RONITA E. TALINGTING
Campus Director

COLLEGE OF ENGINEERING & INFORMATION TECHNOLOGY

OFFICE MEMO

REFERENCE NO. : SSCT – CEIT – 09 – 018, S. 19

DATE : SEPTEMBER 30, 2019

TO : ENGR JOSELITO S. BALDAPAN – Program Chair (BSEE)
DR MONALEE A. DELA CERNA – Program Chair (BSCS)
DR JESSICA ROSE E. FERNANDEZ – Program Chair (BSIS)
ENGR DARWIN C. MANGCA – Program Chair (BSECE)
DR ANALYN S. MORITE – Program Chair (BSCpE)
ENGR VIRNE P. PORTUGUES – Program In-Charge (BSCE)
ALMA CHRISTIE C. REYNA – Program Chair (BSIT)

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

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

Noted by:

DR CARLOS H. DONOSO
Campus Director

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SURIGAO STATE COLLEGE OF TECHNOLOGY

"For Nation's Greater Heights"

COLLEGE OF ENGINEERING AND INFORMATION TECHNOLOGY

TABLE OF SPECIFICATION

FINAL

First Sem., A.Y. 2021-2022

Math 114 - Engineering Data Analysis

Topics	Time Frame (hr)	Weight Percentage	Item Number						Total No. of Items
			Remembering 48%	Understanding 0%	Applying 24%	Analyzing 12%	Evaluating 16%	Creating 0%	
1. Point Estimation of Parameters and Sampling Distributions	4	16%	1, 2, 3		4				4
2. Statistical Intervals for a Single Sample	5	20%	5			8, 9	6, 7		5
3. Tests of Hypotheses for a Single Sample	6	24%	10, 11, 12, 13		15	14			6
4. Statistical Inference of Two Samples	5	20%	16, 17		18		19, 20		5
5. Simple Linear Regression and Correlation	5	20%	21, 22		23, 24, 25				5
Total	25	100%	12	0	6	3	4	0	25

Prepared by:

ENGR. MARK MARVIN D. PAGLINAWAN
Guest Lecturer

Date: 1-5-2022

Checked by:

ENGR. VICENTE DELANTE, MEng'g
Program Chair

Date: 1-6-2022

Approved by:

ENGR. ROBERT R. BACARRO, MECE, MBA
Dean

Date: 1-6-2022

To compute the weight percentage per topic: Divide the number of hours by the total hours times 100.

To determine the number of items per topic: Multiply the corresponding weight by the total number of items. (Items should be distributed to the different levels)

SURIGAO STATE COLLEGE OF TECHNOLOGY

"For Nation's Greater Heights"

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COLLEGE OF ENGINEERING AND INFORMATION TECHNOLOGY

TABLE OF SPECIFICATION

MIDTERM

First Sem., A.Y. 2021-2022

Math 114 - Engineering Data Analysis

Topics	Time Frame (hr)	Weight Percentage	Item Number						Total No. of Items
			Remembering 50%	Understanding 0%	Applying 7%	Analyzing 23%	Evaluating 20%	Creating 0%	
1. Obtaining Data	3	13%	1, 2, 3, 4						4
2. Probability	5	21%	5, 6, 7		18	16, 17			6
3. Discrete Random Variables and Probability Distributions	6	25%	8, 9, 10, 11		19	20, 21, 22			8
4. Continuous Random Variables and Probability Distributions	5	21%	12, 13			26	23, 24, 25		6
5. Joint Probability Distributions	5	21%	14, 15			30	27, 28, 29		6
Total	24	100%	15	0	2	7	6	0	30

Prepared by:

ENGR. MARK MARVIN D. PAGLINAWAN
Guest Lecturer

Date: 1-5-2022

Checked by:

ENGR. VICENTE DELANTE, MEng'g
Program Chair

Date: 1-6-2022

Approved by:

ENGR. ROBERT R. BACARRO, MECE, MBA
Dean

Date: 1-6-2022

To compute the weight percentage per topic: Divide the number of hours by the total hours times 100.

To determine the number of items per topic: Multiply the corresponding weight by the total number of items. (Items should be distributed to the different levels)

COLLEGE OF ENGINEERING & INFORMATION TECHNOLOGY
First Semester, AY 2020-2021

TEST QUESTIONNAIRE
Midterm Examination in **Math 114 – Engineering Data Analysis**

Instruction:
1. Read the questions carefully. You are not permitted to share calculators or any other materials during the examination;
2. For problem analysis, show the detailed solution of the problem in a separate sheet of paper;
3. Shade the bubble in the answer sheet that corresponds to the correct answer of the given test question.

Identification:
1. In this method of data collection, an engineer observes the process or population, disturbing it as little as possible, and records the quantities of interest. ____________
   Ans. **Observational Study**
2. This sampling method involves the researcher using their judgment to select a sample that is most useful to the purposes of the research.____________
   Ans. **Purposive Sampling**
3. This model uses our engineering and scientific knowledge of a phenomenon, but it is not directly developed from our theoretical or first-principles understanding of the underlying mechanism. ______________
   Ans. **Empirical Model**
4. In this sampling method, all members of a population has an equal chance of being selected in which bias is avoided. ______________
   Ans. **Simple Random Sampling**
5. A selection of all or part of a set of objects, without regard to the order in which objects are selected. ____________
   Ans. **Combination**
6. The event consisting of all outcomes that are not in A is called ____________.
   Ans. **Complement of A**
7. If the two events A and B have no outcomes in common they are called ____________.
   Ans. **Mutually Exclusive or Disjoint**
8. If the set of possible values of a random variable is a discrete set then it is _____________.
   Ans. **Discrete**
9. Any rule that associates a number with each outcome in a given sample space S. _____________
   Ans. **Random Variable**
10. A trial with only two possible outcomes is used so frequently as a building block of a random experiment that it is called a _____________.
    Ans. **Bernoulli Trial**
11. It is the discrete probability distribution of the number of events occurring in a given time period, given the average number of times the event occurs over that time period. _____________
    Ans. **Poisson distribution**
12. A random variable which represents some measurement on a continuous scale. _____________
    Ans. **Continuous Random Variable**
13. A continuous distribution that is commonly used to measure the expected time for an event to occur. ____________.
    Ans. **Exponential Distribution**
14. The individual probability distribution of a random variable in a joint probability distribution is referred to as its _____________.
    Ans. **Marginal Probability Distribution**
15. If X and Y are two random variables, the probability distribution that defines their simultaneous behavior is called a _____________.
    Ans. **Joint Probability Distribution**

Problem Analysis:

16. How many licensed plates can be made if each plate has 3 different digits followed by 2 different letters?
    a. 468000 plates
    b. 320000 plates
    c. 543000 plates
    d. 400000 plates

17. A broadway show wants to hire 6 women and 3 men. In how many ways can the choice be made if 9 women and 5 men are available?
    a. 840 ways
    b. 580 ways
    c. 320 ways
    d. 480 ways
18. There is a 30% chance of rain today. If it does not rain today, there is a 20% chance of rain tomorrow. If it rains today, there is a 50% chance of rain tomorrow. What is the probability that it rains tomorrow?
    a. 0.18
    b. 0.21
    c. 0.29
    d. 0.15
19. In a box of 25 external hard disks, there are 2 defectives. An inspector examines 5 of these hard disks. Find the probability that there is at least 1 defective hard disk among the 5.
    a. 0.367
    b. 0.667
    c. 0.076
    d. 0.763
20. In a classroom of 30 students, 3 of the students wear wrist watches. If 14 students are selected *with replacement*, what is the probability that exactly 2 of them wear wrist watches?
    a. 0.257
    b. 0.3586
    c. 0.3223
    d. 0.2924
21. In a classroom of 30 students, 3 of the students wear wrist watches. If 14 students are selected *without replacement*, what is the probability that exactly 2 of them wear wrist watches?
    a. 0.257
    b. 0.3586
    c. 0.3223
    d. 0.2924
22. Find the probability that number 5 appears only once when a fair die is tossed 4 times.
    a. 1/126
    b. 3/4
    c. 1/78
    d. 1/216
23. The pdf of X is f (x) = 0.2, 1 < x < 6. Find P(2 < X < 5).
    a. 1/3
    b. 2/3
    c. 3/5
    d. 2/5
24. Let X be a random variable with pdf f (x) = kx, 0 < x < 4. Find the value of k.
    a. 1/6
    b. 1/8
    c. 2/7
    d. 2/3
25. Let X be a random variable with pdf f (x) = kx, 0 < x < 4. Find *E(X)*.
    a. 8/3
    b. 8/9
    c. 3/8
    d. 1/8
26. It is known that the IQ scores of people in the United States have a normal distribution with mean 100 and standard deviation 15. If a person is selected at random, find the probability that the person's IQ score is less than 85.
    a. 0.1587
    b. 0.0912
    c. 0.1957
    d. 0.7835
27. Suppose the random variables X and Y have joint pdf f (x, y) = 6y, 0 < y < x < 1. Find E(X) and E(Y).
    a. ¾, ½

b. 4/3, ¼
c. ½, ¼
d. 4/3, 1/3

28. Suppose the random variables X and Y have joint pdf f (x, y) = 6y, 0 < y < x < 1. Find Var(X) and Var(Y).
   a. 3/40, 1/30
   b. 1/40, 3/20
   c. 3/80, 1/20
   d. 1/20, 3/60
29. Suppose the random variables X and Y have joint pdf f (x, y) = 6y, 0 < y < x < 1. Find Cov(X, Y).
   a. 1/40
   b. 1/20
   c. 1/30
   d. 1/50
30. You have two lightbulbs for a particular lamp. Let *X*= the lifetime of the first bulb and *Y*= the lifetime of the second bulb (both in 1000s of hours). Suppose that *X* and *Y* are independent and that each has an exponential distribution with parameter $\lambda = 1$. What is the joint pdf of X and Y?
   a. e^{-x-2y} for x≥ 0, y≥ 0
   b. e^{-y} for x≥ 0, y≥ 0
   c. e^{-2x-y} for x≥ 0, y≥ 0
   d. e^{-x-y} for x≥ 0, y≥ 0

Prepared by: **ENGR. VERNON V. LIZA**
Guest Lecturer

Checked by: **ENGR. VICENTE Z. DELANTE, MEng'g**
Program Chair, BSEE

COLLEGE OF ENGINEERING AND INFORMATION TECHNOLOGY
First Semester, Academic Year 2020-2021

COURSE SYLLABUS in MATH 114 – ENGINEERING DATA ANALYSIS

Institutional Vision, Mission, and Goals

Vision:

An innovative an d 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.

Institutional Intended Learning Outcomes

: SSCT graduates are expected to:

1. Demonstrate globally competitive skills;
2. Manifest positive work ethics and flexibility in various work condition;
3. Exhibit knowledge deemed essential towards work requirements.

Programs 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.

Program Educational Objectives and Relationship to Institutional Mission

Program Educational Objectives	Mission		
	a	b	c
PEO 1. Innovative and knowledgeable in the latest trends in electrical engineering and demonstrate in their jobs as professional the technical expertise and practical skills.	✓	✓	✓
PEO 2. Flexible in working with multidisciplinary teams, responsible for providing solutions in electrical engineering showing attributes of professionalism and critical thinking.	✓	✓	✓
PEO 3. Engage in lifelong learning and are taking leadership roles in electrical engineering organization that are valuable to the advancement of the society.	✓	✓	✓

Program Outcomes and Relationship to Program Educational Objectives

Program Outcomes	Program Educational Objectives		
	1	2	3
a. Apply knowledge of mathematics and sciences to solve complex engineering problems	✓	✓	✓
b. Develop and conduct appropriate experimentation, analyze and interpret data;	✓	✓	✓
c. 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.	✓	✓	✓
d. Function effectively on multi-disciplinary and multi-cultural teams that establish goals, plan tasks, and meet deadlines;	✓	✓	✓
e. Identify, formulate, and solve complex problems in electrical engineering;	✓	✓	✓
f. Recognize ethical and professional responsibilities in engineering practice;	✓	✓	✓
g. Communicate effectively with a range of audiences;	✓	✓	✓
h. Understand the impact of engineering solutions in a global, economic, environmental, and societal context;	✓	✓	✓
i. Recognize the need for additional knowledge and engage in lifelong	✓	✓	✓

learning;			
j. Articulate and discuss the latest developments in the field of electrical engineering	✓	✓	✓
k. Apply techniques, skills, and modern engineering tools necessary for electrical engineering practice; and	✓	✓	✓
l. 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 Code MATH 114
Course Title Engineering Data Analysis
Course Credit 3 units
Pre-requisites/Co-requisites Calculus 1

Course Description

This course introduces different methods of data collection and the suitability of using a particular method for a given situation. It includes a coverage and discussion of the relationship of probability to statistics, probability distributions of random variables and their uses, linear functions of random variables within the context of their application to data analysis and inference, estimation techniques for unknown parameters, and hypothesis testing used in making inferences from sample to population, inference for regression parameters and build models for estimating means and predicting future values of key variables under study. Statistically based experimental design techniques and analysis of outcomes of experiments are discussed with the aid of statistical software.

Course Outcomes and Relationship to Program Outcomes

Course Outcomes: After completing this course, the students must be able to	**Program Outcomes**												
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**	**m**
CO1. Classify the different methods that engineers use to collect data;			I		I						I		
CO2. Describe the different methods of sampling in planning and conducting surveys.			I		I						I		
CO3. Identify the advantages that designed experiments have in comparison to other methods of collecting engineering data.			I		I						I		
CO4. Describe sample spaces and events for random experiments with graphs, tables, lists, or tree diagrams.			I		I						I		

CO5. Interpret probabilities and use the probabilities of outcomes to calculate probabilities of events in discrete sample spaces.			I		I						I		
CO6. Apply the rules of probability to compute probabilities of events.			I		I						I		
CO7. Determine probabilities from probability mass functions and the reverse.			I		I						I		
CO8. Determine probabilities and probability mass functions from cumulative distribution functions and the reverse.			I		I						I		
CO9. Calculate means and variances for discrete random variables.			I		I						I		
CO10. Analyze the assumptions for some common discrete probability distributions.			I		I						I		
CO11. Calculate probabilities and determine means and variances for some common discrete probability distributions.			I		I						I		
CO12. Determine probabilities from probability density functions.			I		I						I		
CO13. Determine probabilities from cumulative distribution functions and cumulative distribution functions from probability density functions, and the reverse.			I		I						I		
CO14. Calculate means and variances for continuous random variables.			I		I						I		
CO15. Describe the assumptions for some common continuous probability distributions.			I		I						I		
CO16. Approximate probabilities for binomial and Poisson distributions.			I		I						I		
CO17. Apply joint probability mass functions and joint probability density functions to calculate probabilities and calculate marginal probability distributions from joint probability distributions.			I		I						I		
CO18. Calculate conditional probability distributions from joint probability distributions and assess			I		I						I		

independence of random variables.													
CO19. Interpret and calculate covariances and correlations between random variables.			I		I						I		
CO20. Calculate means and variances for linear functions of random variables and calculate probabilities for linear functions of normally distributed random variables.			I		I						I		
CO21. Determine the distribution of a general function of a random variable.			I		I						I		
CO22. Describe the general concepts of estimating the parameters of a population or a probability distribution.			I		I						I		
CO23. Describe the important role of the normal distribution as a sampling distribution and the central limit theorem.			I		I						I		
CO24. Describe important properties of point estimators, including bias, variance, and mean square error.			I		I						I		
CO25. Solve problems on sampling distributions and point estimations.			I		I						I		
CO26. Describe the three types of interval estimates: confidence intervals, prediction intervals, and tolerance intervals.			I		I						I		
CO27. Construct confidence intervals on the mean of a normal distribution, using either the normal distribution or the *t* distribution method.			I		I						I		
CO28. Construct a prediction interval for a future oobservations.			I		I						I		
CO29. Construct a tolerance interval for a normal distribution.			I		I						I		
CO30. Test hypotheses on the mean of a normal distribution using either a Z-test or a t-test procedure.			I		I						I		
CO31. Test hypotheses on the variance or standard deviation of a normal distribution.			I		I						I		
CO32. Test hypotheses on a population proportion.			I		I						I		

CO33. Apply the P-value approach for making decisions in hypothesis tests.			I		I						I		
CO34. Structure comparative experiments involving two samples as hypothesis tests.			I		I						I		
CO35. Test hypotheses and construct confidence intervals on the difference in means of two normal distributions.			I		I						I		
CO36. Test hypotheses and construct confidence intervals on the ratio of the variances or standard deviations of two normal distributions.			I		I						I		
CO37. Test hypotheses and construct confidence intervals on the difference in two population proportions.			I		I						I		
CO38. Apply simple linear regression for building empirical models to engineering and scientific data.			I		I						I		
CO39. Analyze how the method of least squares is used to estimate the parameters in a linear regression model.			I		I						I		
CO40. Analyze residuals to determine whether the regression model is an adequate fit to the data or whether any underlying assumptions are violated.			I		I						I		
CO41. Test statistical hypotheses and construct confidence intervals on regression model parameters.			I		I						I		
CO42. Apply the regression model to predict a future observation.			I		I						I		
CO43. Apply the correlation model.			I		I						I		
Level: I – Introductory E – Enabling D - Demonstrative													

Detailed Course Syllabus

Course Outcomes	Topics	Time Frame	Teaching and Learning Activities	Assessment Tasks	Resources	Values Integration	Remarks
Express understanding of the Vision and Mission statements of SSCT, including its Goals and Objectives; Analyze the syllabus by looking into the ILOs, Subject Matter, TLAs, Assessment Strategies, Values and References; and Design strategies that will help meet the requirements and obtain desired grades/marks for the course	**ORIENTATION ON THE COURSE** **VMGO** **Syllabus** **Grading System**	1 hr.	*Big Group Discussion* on VMGO *Documentary Analysis* of Syllabus and Grading System *Concept Mapping (Sunflower Map/Fishbone Map)* on strategies to meet course requirements		Computer/ Projector for PowerPoint presentation of the VMGO Syllabus	Obedience, Punctuality, Diligence	

	1. OBTAINING DATA						
CO1. Classify the different methods that engineers use to collect data;	**1.1. Methods of Data Collection** **1.1.1. Retrospective Study** **1.1.2. Observational Study** **1.1.3. Designed Experiments**	0.5 hr.	Instructor provides reading module for each subtopic **1.1** to **1.3** which can be available online and offline/hardcopy (upon request).	Assignment and quiz on the methods obtaining data	Module from Instructor Computer/laptop/cellular phone (optional)	Attentiveness, Diligence, self-reliance	
CO2. Describe the different methods of sampling in planning and conducting surveys.	**1.2. Planning and Conducting Surveys** **1.2.1. Sampling Methods** **1.2.2. Sources of Bias in Sampling and Surveys**	0.5	Students can ask the clarifications and questions through Google Classroom, Messenger Group Chat, or text message	Objectives quiz the different methods of sampling in planning and conducting surveys.	Online Resources (optional)	Attentiveness, Diligence, self-reliance	
CO3. Identify the advantages that designed experiments have in comparison to other methods of collecting engineering data.	**1.3. Planning and Conducting Experiments: Introduction to Design of Experiments** **1.3.1. Strategy of Experimentation** **1.3.2. Mechanistic and Empirical Model**	2 hr.		Objectives quiz on other methods of collecting engineering data.		Diligence, self-reliance, appreciation Diligence, self-reliance	
	2. PROBABILITY						

CO4. Describe sample spaces and events for random experiments with graphs, tables, lists, or tree diagrams. CO5. Interpret probabilities and use the probabilities of outcomes to calculate probabilities of events in discrete sample spaces. CO6. Apply the rules of probability to compute probabilities of events.	**2.1. Sample Spaces and Events** **2.1.1. Random Experiments** **2.1.2. Sample Spaces** **2.1.3. Events** **2.2. Counting Rules Useful in Probability** **2.2.1. Permutations** **2.2.2. Combinations** **2.3. Rules of Probability** **2.3.1. Unions of Events and Addition Rules** **2.3.2. Conditional Probability** **2.3.3. Intersections of Events and Multiplication and Total Probability Rules** **2.3.4. Independence** **2.4. Bayes' Theorem**	0.5 hr. 2 hrs. 2 hrs. .5 hr.	Instructor provides reading module for each subtopic **2.1** to **2.4** which can be available online and offline/hardcopy (upon request). Students can ask the clarifications and questions through Google Classroom, Messenger Group Chat, or text message	Assignment and objective quiz on sample spaces and events. Problem solving quiz on the counting rules used in probability. Problem solving quiz on the rules of probability.	Module from Instructor Computer/laptop/cellular phone (optional) Online Resources (optional)	Resourceful-ness, Diligence and perseverance Diligence and analytical thinking Diligence, perseverance and analytical thinking	

	3. DISCRETE RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS						
CO7. Determine probabilities from probability mass functions and the reverse.	**3.1. Probability Distributions and Probability Mass functions**	1 hr.	Instructor provides reading module for each subtopic **3.1** to **3.7** which can be available online and offline/hardcopy (upon request).	Assignment and problem solving quiz probability mass functions and cumulative distribution functions	Module from Instructor Computer/laptop/cellular phone (optional) Online Resources (optional)	Diligence; retention	
CO8. Determine probabilities and probability mass functions from cumulative distribution functions and the reverse.	**3.2. Cumulative Distribution Functions**	1 hr.				Patience Diligence	
CO9. Calculate means and variances for discrete random variables.	**3.3. Mean and Variance of a Discrete Random Variable**	1 hr.	Students can ask the clarifications and questions through Google Classroom, Messenger Group Chat, or text message.	Problem solving quiz on means and variances for discrete random variables		Patience, diligence and analytical thinking	
CO10. Analyze the assumptions for some common discrete probability distributions. CO11. Calculate probabilities and determine means and variances for some common discrete probability distributions.	**3.4. Discrete Uniform Distribution** **3.5. The Binomial Distribution** **3.6. Hypergeometric Distribution** **3.7. The Poisson Distribution**	3 hrs.		Assignment and problem solving quiz on other common discrete probability distributions		Diligence, appreciation, self-reliance	
	4. CONTINUOUS RANDOM VARIABLES AND						

	PROBABILITY DISTRIBUTIONS						
CO12. Determine probabilities from probability density functions.	**4.1. Probability Distributions and Probability Density Functions**	1 hr.	Instructor provides reading module for each subtopic **4.1** to **4.7** which can be available online and offline/hardcopy (upon request). Students can ask the clarifications and questions through Google Classroom, Messenger Group Chat, or text message.	Problem quiz on probability density functions	Module from Instructor Computer/laptop/cellular phone (optional) Online Resources (optional)	Diligence and appreciation	
CO13. Determine probabilities from cumulative distribution functions and cumulative distribution functions from probability density functions, and the reverse.	**4.2. Cumulative Distribution Functions**	1 hr.		Problem quiz on cumulative distribution functions		Diligence and patience	
CO14. Calculate means and variances for continuous random variables.	**4.3. Mean and Variance of a Continuous Random Variable**	1 hr.		Assignment problem on means and variances		Perseverance	
CO15. Describe the assumptions for some common continuous probability distributions.	**4.4. Continuous Uniform Distribution** **4.5. Normal Distribution**	1 hr.		Written quiz on common continuous probability distributions		Self confidence	
CO16. Approximate probabilities for binomial and Poisson distributions.	**4.6. Normal Approximation to the Binomial and Poisson Distribution** **4.7. Exponential Distribution**	1 hr.		Problem quiz on approximating probabilities for binomial and poisson distributions		Diligence and self-reliance	

	5. JOINT PROBABILITY DISTRIBUTIONS						
CO17. Apply joint probability mass functions and joint probability density functions to calculate probabilities and calculate marginal probability distributions from joint probability distributions.	**5.1. Joint Probability Distributions for Two Random Variables**	1 hr.	Instructor provides reading module for each subtopic **5.1** to **5.6** which can be available online and offline/hardcopy (upon request).	Assignment and problem solving quiz on joint probability distributions	Module from Instructor Computer/laptop/cellular phone (optional)	Diligence, appreciation	
CO18. Calculate conditional probability distributions from joint probability distributions and assess independence of random variables.	**5.2. Conditional Probability Distributions and Independence** **5.3. Joint Probability Distributions for More Than Two Random Variables**	1 hr.	Students can ask the clarifications and questions through Google Classroom, Messenger Group Chat, or text message.	Analysis problem solving quiz on conditional probability distributions	Online Resources (optional)	Perseverance and analytical thinking Creativity; diligence	
CO19. Interpret and calculate covariances and correlations between random variables.	**5.4. Covariance and Correlation**	1 hr.		Analysis problem quiz on covariance and correlation		Critical thinking, diligence	
CO20. Calculate means and variances for linear functions of random variables and calculate probabilities for linear functions of normally	**5.5. Linear Functions of Random Variables**	1 hr.		Assignment on linear functions of random variables		Diligence and analytical thinking	

distributed random variables. CO21. Determine the distribution of a general function of a random variable.	**5.6. General Functions of Random Variables**	1 hr.		Objective quiz on general functions of random variables		Perseverance and critical thinking	
		MIDTERM EXAMINATION (2 hours)					
CO22. Describe the general concepts of estimating the parameters of a population or a probability distribution. CO23. Describe the important role of the normal distribution as a sampling distribution and the central limit theorem. CO24. Describe important properties of point estimators, including bias, variance, and mean square error. CO25. Solve problems on sampling distributions and point estimations.	**6. SAMPLING DISTRIBUTIONS AND POINT ESTIMATION OF PARAMETERS** **6.1. Point Estimation** **6.2. Sampling Distribution and the Central Limit Theorem** **6.3. General Concept of Point Estimation** **6.3.1. Unbiased Estimator** **6.3.2. Variance of a Point Estimator**	1 hr. 1 hr. 2 hr.	Instructor provides reading module for each subtopic **6.1** to **6.3** which can be available online and offline/hardcopy (upon request). Students can ask the clarifications and questions through Google Classroom, Messenger Group Chat, or text message.	Assignment and objective quiz on the concept of point estimation Assignment on the role of normal distribution and the concept of central limit theorem Problem solving quiz on the general concept of point estimation	Module from Instructor Computer/laptop/cellular phone (optional) Online Resources (optional)	Diligence and appreciation Appreciation Appreciation, diligence and analytical thinking	

	6.3.3. Standard Error **6.3.4. Bootstrap Standard Error** **6.3.5. Mean Squared Error of an Estimator**						
CO26. Describe the three types of interval estimates: confidence intervals, prediction intervals, and tolerance intervals. CO27. Construct confidence intervals on the mean of a normal distribution, using either the normal distribution or the *t* distribution method.	**7. STATISTICAL INTERVALS FOR A SINGLE SAMPLE** **7.1. Confidence Interval on the Mean of a Normal Distribution, Variance Known** **7.1.1. Choice of Sample Size** **7.1.2. One-Sided Confidence Bounds** **7.1.3. Large-Sample Confidence Interval for μ** **7.2. Confidence Interval on the Mean of a Normal Distribution, Variance**	2 hrs. 2 hrs.	Instructor provides reading module for each subtopic **7.1** to **7.4** which can be available online and offline/hardcopy (upon request). Students can ask the clarifications and questions through Google Classroom, Messenger Group Chat, or text message	Quiz on the three types of interval estimates. Analysis problem quiz on confidence interval.	Module from Instructor Computer/laptop/cellular phone (optional) Online Resources (optional)	Appreciation and perseverance Diligence and analytical thinking	

	Unknown **7.2.1. *t* Distribution** **7.2.2. *t* Confidence Interval on μ** **7.3. Guidelines for Constructing Confidence Intervals**						
CO28. Construct a prediction interval for a future oobservations. CO29. Construct a tolerance interval for a normal distribution.	**7.4. Tolerance and Prediction Intervals** **7.4.1. Prediction Interval for a Future Observation** **7.4.2. Tolerance Interval for a Normal Distribution**	1 hr.		Analysis problem quiz on tolerance and prediction interval.		Diligence and perseverace	
CO30. Test hypotheses on the mean of a normal distribution using either a Z-test or a t-test procedure.	**8. TEST OF HYPOTHESIS FOR A SINGLE SAMPLE** **8.1. Hypothesis Testing** **8.1.1. One-sided and Two-sided Hypothesis** **8.1.2. P-value in Hypothesis Tests** **8.1.3. General Procedure for Test of**	2 hrs.	Instructor provides reading module for each subtopic **8.1** to **8.5** which can be available online and offline/hardcopy (upon request). Students can ask the clarifications and questions	Problem solving quiz on hypothesis testing	Module from Instructor Computer/laptop/cellular phone (optional) Online Resources (optional)	Diligence	

CO31. Test hypotheses on the variance or standard deviation of a normal distribution.	**Hypothesis** **8.2. Test on the Mean of a Normal Distribution, Variance Known** **8.3. Test on the Mean of a Normal Distribution, Variance Unknown** **8.4. Test on the Variance and Statistical Deviation of a Normal Distribution**	2 hrs.	through Google Classroom, Messenger Group Chat, or text message.	Problem solving quiz on hypothesis testing on variance or standard deviation		Diligence	
CO32. Test hypotheses on a population proportion. CO33. Apply the P-value approach for making decisions in hypothesis tests.	**8.5. 8.5. Test on a Population Proportion**	2 hrs.		Analysis problem solving quiz on hypothesis testing using the P-value		Perseverance, Critical thinking	
	9. STATISTICAL INFERENCE OF TWO SAMPLES						
CO34. Structure comparative experiments involving two samples as hypothesis tests.	**9.1. Inference on the Difference in Means of Two Normal Distributions, Variances Known**	1 hr.	Instructor provides reading module for each subtopic **9.1** to **9.4** which can be available online and offline/hardcopy	Analysis problem quiz on hypothesis testing involving two samples	Module from Instructor Computer/laptop/cellular phone	Critical thinking	

			(upon request).		(optional)		
CO35. Test hypotheses and construct confidence intervals on the difference in means of two normal distributions.	**9.2. Inference on the Difference in Means of Two Normal Distributions, Variances Unknown**	2 hrs.	Students can ask the clarifications and questions through Google Classroom, Messenger Group Chat, or text message	Problem solving quiz on the difference in means of two normal distributions	Online Resources (optional)	Analytical thinking and diligence	
CO36. Test hypotheses and construct confidence intervals on the ratio of the variances or standard deviations of two normal distributions.	**9.3. Inference on the Variance of Two Normal Distributions**	1 hr.		Problem solving quiz on variance of two normal distributions		Analytical thinking and diligence	
CO37. Test hypotheses and construct confidence intervals on the difference in two population proportions.	**9.4. Inference on Two Population Proportions**	1 hr.		Problem solving quiz on the difference in two population proportions		Diligence	
	10. SIMPLE LINEAR REGRESSION AND CORRELATION						
CO38. Apply simple linear regression for building empirical models to engineering and scientific data. CO39. Analyze how the method of least squares is used to estimate the parameters in a linear	**10.1. Empirical Models** **10.2. Regression: Modelling Linear Relationships – The Least-Squares Approach** **10.3. Correlation:**	2 hrs.	Instructor provides reading module for each subtopic **10.1** to **10.7** which can be available online and offline/hardcopy (upon request). Students can ask	Assignment and problem solving on simple linear regression and correlation	Module from Instructor Computer/laptop/cellular phone (optional) Online	Perseverance and critical thinking	

regression model. CO40. Analyze residuals to determine whether the regression model is an adequate fit to the data or whether any underlying assumptions are violated. CO41. Test statistical hypotheses and construct confidence intervals on regression model parameters.	**Estimating the Strength of Linear Relation** **10.4. Hypothesis Tests in Simple Linear Regression** **10.4.1. Use of t-tests** **10.4.2. Analysis of Variance Approach to Test Significance of Regression**	1 hr. 1 hr.	the clarifications and questions through Google Classroom, Messenger Group Chat, or text message	Analysis problems on simple linear regression using hypothesis testing	Resources (optional)	Diligence and analytical thinking Diligence and patience Perseverance	
CO42. Apply the regression model to predict a future observation.	**10.5. Prediction of New Observations** **10.6. Adequacy of the Regression Model** **10.6.1. Residual Analysis** **10.6.2. Coefficient of Determinatio n**	0.5 hr.		Analysis problem solving on regression to predict future observation			
CO43. Apply the correlation model.	**10.7. Correlation**	0.5 hr.		Problem solving on correlation		Diligence	
FINAL EXAMINATION (3 hours)							

References:

- Douglas C. Montgomery & George C. Runger. Applied Statistics And Probability For Engineers. John Wiley & Sons; 7th ed. 2018.
- Hongshik Ahn. Probability And Statistics For Sciences & Engineering with Examples in R. Cognella, Inc.; 2nd ed. 2018.

Course Requirements:

- Assignment and Quizzes
- Problems Sets and Activities
- Midterm & Final Examination

Course Evaluation:

Criteria	Lecture Grade
Quizzes and Online outputs/interaction	25%
Performance Tasks (project/ assignment)	35%
Major Exams (Midterm & Finals)	40%
TOTAL	**100%**

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

Source: *SSCT Student Handbook*

Course Policies:

1. Attendance will be checked in every class sessions to prove the students' presence in the class. This is to monitor whether absences incurred by the student is still within the allowed number of absences for a course as stipulated in the Student Handbook.
2. Excuse from the class will only be honoured if a Memo from the school is issued before the absence or valid excuse letter from parents/guardians is presented after the absence. No other excuses will be entertained.
3. The use of multiple choice questionnaires is used during the midterm and final examination. However, for problem solving, a detailed solution is required written legibly in a separate long size bond paper or newsprint.
4. Cheating in midterm and final examination will entail a zero score. Cheating is defined to include an attempt to defraud, deceive, or mislead the instructor in arriving at honest grade assessment.
5. Plagiarism in papers and other works will entail zero score. Plagiarism is a form of cheating that involves presenting as one's own work the ideas or work of another.
6. Students who fail to take the midterm and final examination as scheduled shall be required to write an explanation letter address to the Program Chair, noted by the parents/guardian, and approved by the Dean. After that, he/she can take the missed examination.
7. Clearance is required when the student take the final examination based on No Clearance No Examination Policy.
8. Project shall be submitted on the set deadline by the instructor. Unsatisfactory project will not be accepted. However, the student will be given a chance to improve their project. Non-submission of the project on the set deadline means a zero score.

Revision History:

Revision No.	Date of Revision	Date of Implementation	Highlight of Revision
1	August 2019	1st Sem, AY 2019-2020	Followed school OBTL Format as per CMO #101 S. 2017
2	December 5, 2020	1st Sem, AY 2020-2021	Followed suggestion from ChED COPC.

Preparation, Review, and Approval:

Prepared by:

ENGR. VERNON V. LIZA
Guest Lecturer
Date: Aug 11, 2020

Checked and Reviewed by:

ENGR. VICENTE Z. DELANTE, MEng'g
Program Chair, BSEE
Date: Aug 11, 2020

Noted:

ENGR. ROBERT R. BACARRO, MECE, MBA
Dean, CEIT
Date: Aug 13, 2020

Recommending Approval:

DR. RONITA E. TALINGTING
Campus Director
Date: Aug 14, 2020

Approved by:

DR. EMMYLOU A. BORJA
VP for Academic Affairs
Date: Aug. 14, 2020

SURIGAO STATE COLLEGE
OF TECHNOLOGY

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July 15, 2022

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING (BSEE)

Based on CMO No. 88. s. 2017

Effective A.Y 2022-2023

MR. RAMEL F. JAMEN

First Year

First Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
MATH 110	Basic Engineering Mathematics	0	1	1	None
MATH 111	Calculus 1	4	0	4	None
ES 133 (ES 101)	Computer-aided Drafting	0	1	1	None
GE Math	Mathematics in the Modern World	3	0	3	None
GE PurCom	Purposive Communication	3	0	3	None
CHEM 121 (CHEM 101)	Chemistry for Engineers	3	1	4	None
PE 1 (PATHFit 1)	Movement Competency Training or MCT	2	0	2	None
NSTP 1	National Service Training Program 1	3	0	3	None
	Sub- Total	18	3	21	

Second Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
Math 112	Calculus 2	4	0	4	Math 111
Phys 122 (Phys 102)	Physics for Engineers	3	1	4	Math 111; Co-requisite Math 112
GE Entrep	The Entrepreneural Mind	3	0	3	None
GE LITE	Living in the IT Era	3	0	3	None
CPE 143 (CPE 101)	Computer Programming	0	1	1	None
GE USelf	Understanding the Self	3	0	3	None
PE 2 (PATHFit 2)	Exercise-based Fitness Activities	2	0	2	None
NSTP 2	National Service Training Program 2	3	0	3	NSTP 1
	Sub- Total	21	2	23	

Second Year

First Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
Math 113	Differential Equations	3	0	3	Math 112
EE 201 (EE 102)	Electrical Circuits 1	3	1	4	Phys 122; Math 112
Math 114	Engineering Data Analysis	3	0	3	Math 111
IC 104	Review in Mathematics	3	0	3	None
GE Hist	Readings in Philippine History	3	0	3	None
GE Rizal	Life and Works of Rizal	3	0	3	None
GE STS	Science, Technology and Society	2	0	2	None
PE 3 (PATHFit 3)	Choice of Dance, Sports, Martial Arts, Group Exercise, Outdoor and Adventure Activities	2	0	2	None
	Sub- Total	22	1	23	

Second Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
Math 161	Engineering Mathematics for EE	3	0	3	Math 113
EE 202 (EE 103)	Electrical Circuits 2	3	1	4	EE 201
ECE 201 (ECE 101)	Electronic Circuits, Devices and Analysis	3	1	4	EE 201
ES 262 (ES 102)	Basic Thermodynamics	2	0	2	Phys 122
GE ArtApp	Art Appreciation	0	1	1	None
GE ConWorld	Contemporary World	3	0	3	None
ES 255	Engineering Mechanics	3	0	3	Phys 122 (Phys 102)
PE 4 (PATHFit 4)	Choice of Dance, Sports, Martial Arts, Group Exercise, Outdoor and Adventure Activities	2	0	2	None
	Sub- Total	19	3	22	

Third Year

First Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
EE 301 (104)	Numerical Methods and Analysis	2	1	3	Math 161
ECE 371 (ECE 102)	Logic Circuits and Switching Theory	2	0	2	ECE 201
ES 261 (ES 104)	Fundamentals of Deformable Bodies	3	0	3	Math 114; GE PurCom
ES 302 (ES 105)	Fluid Mechanics	2	0	2	ES 262
ES 137 (ES 106)	Engineering Economics	3	0	3	3rd year standing
ECE 252 (ECE 103)	Electromagnetics	2	0	2	None
EE 311 (EE 105)	Industrial Electronics	3	1	4	ECE 201
EE 312 (EE 106)	Fundamentals of Electronic Communications	3	0	3	ECE 201
EE 302 (EE 107)	Electrical Machines 1	1	1	2	ECE 252; EE 202
	Sub- Total	21	3	24	

Second Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
CpE 371	Microprocessor Systems	2	0	2	ECE 371
ES 140 (107)	Research Methods	0	1	1	3rd year standing
EE 304 (EE 108)	Electrical Apparatus and Devices	2	1	3	EE 202
EE 303 (EE 109)	Electrical Machines 2	3	1	4	EE 302
ES 301 (ES 108)	Basic Occupational Safety and Health	3	0	3	3rd year standing
ES 246 (109)	Environmental Science and Engineering	2	0	2	Chem 121
EE 305 (EE110)	EE Law, Codes, and Professional Ethics	2	0	2	GE Eth
ECE 357	Feedback and Control Systems	2	0	2	Math 161; ECE 201
GE Eth	Ethics	3	0	3	None
	Sub- Total	19	3	22	

Summer				
Course Code	Descriptive Title	No. of Hours	Units	Pre-requisite
Practicum	On-the-Job Training	240	2	4th Year Standing
	Sub- Total	240	2	

Fourth Year

First Semester					
Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
ES 142 (ES 110)	Materials Science and Engineering	2	0	2	CHEM 121; ES 261
EE 401 (EE 111)	Electrical Standards and Practices	0	1	1	EE 305
EE 402 (EE112)	Electrical Systems and Illumination Engineering Design	3	2	5	EE 303
EE 481 (EE 113)	Professional Elective 1(Power Systems Protection)	3	0	3	4th year standing
EE 164 (EE 114)	Management of Engineering Projects	2	0	2	ES 137
EE 422 (EE 115)	Research Project or Capstone Design Project for EE	0	1	1	ES 142
EE 403 (EE 116)	Instrumentation and Control	2	1	3	ECE 357
IC 105	EE REVIEW 2 (General Engineering Review)	0	1	1	5th year standing
	Sub- Total	12	6	18	

Second Semester					
Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
EE 431 (EE 117)	Power Systems Analysis	3	1	4	EE 401
EE 432 (EE 118)	Fundamentals of Power Plant Engineering Design	0	1	1	Co-requisite: EE 431
EE 433 (EE 119)	Distribution Systems and Substation Design	2	1	3	Co-requisite: EE 431
EE 482 (EE 120)	Professional Elective 2 (Electrical Audit Evaluation)	3	0	3	EE 481
ES 138 (ES 111)	Technopreneurship	3	0	3	4th year standing
ES 484	Seminars/Colloquia & Field Trips	0	1	1	4th year standing
IC 106	EE REVIEW 3	0	1	1	4th year standing
GE EnviSci	Environmental Science	3	0	3	None
	Sub- Total	14	5	19	
	Grand Total			174	

SUMMARY	UNITS
I. Technical Courses	
A. Mathematics	14
B. Natural/Physical Sciences	8
C. Basic Engineering Sciences	10
Allied Courses	31
E. Professional Courses	51
F. Electives	6
H. Institutional Courses	6
Sub-Total	126
II. Non-Teachnical Courses	
A. GE Education Courses	22
B. GEC Elective/Mandated Cour	12
C. Physical Education	8
D. NSTP	0
Sub-Total	48
Grand-Total	174

CHED CARAGA
Education Supervisor II
061522

Prepared by:

ENGR. VICENTE Z. DELANTE, MEng'g
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SUC President III

SURIGAO STATE COLLEGE OF TECHNOLOGY
College of Engineering & Information Technology
Narciso St., Surigao City

BACHELOR OF SCIENCE IN CIVIL ENGINEERING (BSEE)

(Specialized in Construction Engineering and Management)
CMO No. 92, Series of 2017
BOT Resolution No. 29, Series 2018
Effective A. Y. 2018-2019

Student Name: ______________________ **ID No.:** ______________________
Address: ______________________ **Contact Number:** ______________________

FIRST YEAR						
1st Year - First Semester						
Course Code	Course Name	No. of Hours			Prerequisite/Co-requisite
		Lec	Lab	Units	
MATH 111	Calculus 1	3	0	3	None
ES 130	Civil Engineering Orientation	2	0	2	None
CHEM 121	Chemistry for Engineers	3	3	4	None
GE STS	Science, Technology and Society	3	0	3	None
GE Math	Mathematics in Modern World	3	0	3	None
GE Fili 1	Kontekstwalisadong Komuniskasyon sa Filipino	3	0	3	None
PE 1	Physical Fitness & Health	2	0	2	None
NSTP 1	National Service Training Program1	3	0	3	None
	SUB- TOTAL	**22**	**3**	**23**	

1st Year -Second Semester					
Course Code	Course Name	No. of Hours			Prerequisite/Co-requisite
		Lec	Lab	Units	
MATH 112	Calculus 2	3	0	3	Math 111
PHYS 122	Physics for Engineers (Calculus Based)	3	3	4	Math 111/ Co-requisite of Math 112
ES 131	Engineering Drawing and Plans	0	3	1	None
GEOL 123	Geology for Civil Engineers	2	0	2	Chem 121
GE PurComm	Purposive Communication	3	0	3	None
GE Eth	Ethics	3	0	3	None
GE Fili 2	Filipino sa Iba't-ibang Disiplina	3	0	3	Fili 1
PE 2	Rhytmic Activities	2	0	2	None
NSTP 2	National Service Training Program 2	3	0	3	NSTP 2
	SUB- TOTAL	**22**	**6**	**24**	

SECOND YEAR					
2nd Year - First Semester					
Course Code	Course Name	No. of Hours			Prerequisite/Co-requisite
		Lec	Lab	Units	
ES 134	Statics of Rigid Bodies	3	0	3	Math 112 & Phys 122
CE 245	Fundamentals of Surveying	3	3	4	ES 131
ES 137	Engineering Economics	3	0	3	2nd Year Standing
ES 141	Engineering Utilities 1 (Basic EE)	3	0	3	P6 122
ES 142	Engineering Utilities 2 (Basic ME)	3	0	3	P6 122
MATH 113	Differential Equations	3	0	3	Math 112
GE EnviSci	Environmental Science	3	0	3	Fili 1
PE 3	Individual & Dual Sports	2	0	2	None
	SUB- TOTAL	**23**	**3**	**24**	

2nd Year - Second Semester					
Course Code	Course Name	No. of Hours			Prerequisite/Co-requisite
		Lec	Lab	Units	
ES 135	Dynamics of Rigid Bodies	2	0	2	ES 134
ES 136	Mechanics of Deformable Bodies	4	0	4	ES 134
MATH 114	Engineering Data Analysis	3	0	3	Math 111
ES 132	Computer Fundamentals and Programming	0	6	2	2nd Year Standing
ES 139	Engineering Management	3	0	3	2nd Year Standing
GE ConWorld	Contemporary World	3	0	3	None
GE Hist	Readings in Philippine History	3	0	3	None
PE 4	Team Sports	2	0	2	None
	SUB-TOTAL	**20**	**6**	**22**	

THIRD YEAR					
3rd Year - First Semester					
Course Code	**Course Name**	**No. of Hours**			**Prerequisite/Co-requisite**
		Lec	**Lab**	**Units**	
CE 360	Structural Theory	3	3	4	ES 136
CE 351	Construction Materials & Testing	2	3	3	ES 136
CE 346	Highway and Railroad Engineering	3	0	3	CE 245
MATH 115	Numerical Solutions to CE Problems	2	3	3	ES 113
ES 133	Computer-Aided Drafting	0	3	1	3rd Year Standing
CE 354	Building Systems Design	2	3	3	ES 131
ES 140	Research Methods	3	0	3	Math 114 & GE PurComm
GE Rizal	Life and Works of Rizal	3	0	3	None
	SUB-TOTAL	**18**	**15**	**23**	

3rd Year - Second Semester					
Course Code	**Course Name**	**No. of Hours**			**Prerequisite/Co-requisite**
		Lec	**Lab**	**Units**	
CE 361	Principles of Steel Design	2	3	3	CE 360
CE 362	Principles of Reinforced/Prestressed Concrete	3	3	4	CE 360
CE 370	Hydrology	2	0	2	Math 112
CE 371	Hydraulics	4	3	5	ES 135 & ES 136
CE 452	CE Law, Ethics and Contracts	3	0	3	4th Year Standing
ES 138	Technopreneurship	3	0	3	3rd Year Standing
GE Uself	Understanding the Self	3	0	3	None
	SUB-TOTAL	**20**	**9**	**23**	

3rd Year - SUMMER					
Course Code	**Course Name**	**No. of Hours**			**Prerequisite/Co-requisite**
		Lec	**Lab**	**Units**	
CE Practicum	On-the-Job Training - 240 Hours	2	3	3	4th Year Standing
	SUB-TOTAL	**2**	**3**	**3**	

FOURTH YEAR					
4th Year - First Semester					
Course Code	**Course Name**	**No. of Hours**			**Prerequisite/Co-requisite**
		Lec	**Lab**	**Units**	
CE 498	CE Project 1	1	3	2	ES 140 & 4th Year Standing
CE 480	Geotechinical Engineering 1 (Soil Mechanics)	3	3	4	Geol 123, ES 136 & 4th Year
CE 347	Principles of Transportation Engineering	3	0	3	CE 346
CE 456	Construction Cost Engineering	3	0	3	4th Year Standing
CE 457	Project Construction and Management	3	0	3	4th Year Standing
CE 455	Quantity Surveying	1	3	2	CE 354
GE ArtApp	Art Appreciation	3	0	3	None
GE Lit	Philippine Literature	3	0	3	None
	SUB-TOTAL	**20**	**9**	**23**	

4th Year-Second Semester					
Course Code	**Course Name**	**No. of Hours**			**Prerequisite/Co-requisite**
		Lec	**Lab**	**Units**	
CE 499	CE Project 2	1	3	2	CE 498
CE 453	Construction Methods and Project Management	3	0	3	4th Year Standing
CE 458	Construction Occupational Safety and Health (COSH)	3	0	3	4th Year Standing
CE 459	Data Management in Construction	3	0	3	4th Year Standing
CE 460	Advanced Construction Methods & Equipment	3	0	3	4th Year Standing
CE 491	CE Engineering Correlation Course	3	0	3	4th Year Standing
CE 493	CE Special Topics, Seminars and Field Trips	0	3	1	4th Year Standing
	SUB-TOTAL	**16**	**6**	**18**	

	GRAND TOTAL	**163**	**60**	**183**	

The nth Year Standing means that the student shall have completed at least 75% of the load requirements and passed all technical courses of the previous year level .

BACHELOR OF SCIENCE IN CIVIL ENGINEERING (BSCE)
(Specialized in Construction Engineering and Management)
CMO No. 92, S. 2017
Effective A. Y. 2020-2021

First Year

First Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
MATH 111	Calculus	5	0	5	None
ES 130	Civil Engineering Orientation	2	0	2	None
CHEM 121	Chemistry for Engineers	3	1	4	None
GE STS	Science, Technology and Society	3	0	3	None
GE Math	Mathematics in Modern World	3	0	3	None
PE 1	Physical Fitness & Health	2	0	2	None
NSTP 1	National Service Training Program1	3	0	3	None
	Sub- Total	**21**	**1**	**22**	

Second Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
Math 112	Calculus 2	5	0	5	Math 111
Phys 122	Physics for Engineers	3	1	4	Math 111; Co-requisite Math 112
ES 131	Engineering Drawing and Plans	0	1	1	None
GEOL 123	Geology for Civil Engineers	2	0	2	Chem 121
GE ConWorld	Contemporary World	3	0	3	None
GE PurComm	Purposive Communication	3	0	3	None
GE Eth	Ethics	3	0	3	None
PE 2	Rhytmic Activities	2	0	2	None
NSTP 2	National Service Training Program 2	3	0	3	NSTP 2
	Sub- Total	**24**	**2**	**26**	

Second Year

First Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
ES 134	Statics of Rigid Bodies	3	0	3	Math 112 & Phys 122
CE 245	Fundamentals of Surveying	3	1	4	ES 131
ES 137	Engineering Economics	3	0	3	2nd Year Standing
ES 141	Engineering Utilities 1 (Basic EE)	3	0	3	P6 122
ES 142	Engineering Utilities 2 (Basic ME)	3	0	3	P6 122
MATH 113	Differential Equations	3	0	3	Math 112
GE EnviSci	Environmental Science	3	0	3	None
PE 3	Individual & Dual Sports	2	0	2	None
	Sub- Total	**23**	**1**	**24**	

Second Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
ES 135	Dynamics of Rigid Bodies	2	0	2	ES 134
ES 136	Mechanics of Deformable Bodies	4	0	4	ES 134
MATH 114	Engineering Data Analysis	3	0	3	Math 111
ES 132	Computer Fundamentals and Programming	0	2	2	2nd Year Standing
ES 139	Engineering Management	3	0	3	2nd Year Standing
GE Entrep	The Entrepreneural Mind	3	0	3	None
GE Hist	Readings in Philippine History	3	0	3	None
PE 4	Team Sports	2	0	2	None
	Sub- Total	**20**	**2**	**22**	

Third Year

First Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
CE 360	Structural Theory	3	1	4	ES 136
CE 351	Construction Materials & Testing	2	1	3	ES 136
CE 346	Highway and Railroad Engineering	3	0	3	CE 245
MATH 115	Numerical Solutions to CE Problems	2	1	3	ES 113
ES 133	Computer-Aided Drafting	0	1	1	3rd Year Standing
CE 354	Building Systems Design	2	1	3	ES 131
ES 140	Research Methods	3	0	3	Math 114 & GE PurComm
GE Rizal	Life and Works of Rizal	3	0	3	None
	Sub- Total	**18**	**5**	**23**	

Second Semester

Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
CE 361	Principles of Steel Design	2	1	3	CE 360
CE 362	Principles of Reinforced/Prestressed Concrete	3	1	4	CE 360
CE 370	Hydrology	2	0	2	Math 112
CE 371	Hydraulics	4	1	5	ES 135 & ES 136
CE 452	CE Law, Ethics and Contracts	3	0	3	4th Year Standing
ES 138	Technopreneurship	3	0	3	3rd Year Standing
GE Uself	Understanding the Self	3	0	3	None
	Sub- Total	**20**	**3**	**23**	

Summer					
Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
CE Practicum	On-the-Job Training	2	240	3	4th Year Standing
	Sub- Total	2	240	3	

Fourth Year					
First Semester					
Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
CE 498	CE Project 1	1	1	2	ES 140 & 4th Year Standing
CE 480	Geotechinical Engineering 1 (Soil Mechanics)	3	1	4	Geol 123, ES 136 & 4th Year
CE 347	Principles of Transportation Engineering	3	0	3	CE 346
CE 456	Construction Cost Engineering	3	0	3	4th Year Standing
CE 457	Project Construction and Management	3	0	3	4th Year Standing
CE 455	Quantity Surveying	1	1	2	CE 354
GE ArtApp	Art Appreciation	3	0	3	None
GE LITE	Living in the IT Era	3	0	3	None
	Sub- Total	20	3	23	

Second Semester					
Course Code	Descriptive Title	Lec	Lab	Units	Pre-requisite
CE 499	CE Project 2	1	1	2	CE 498
CE 453	Construction Methods and Project Management	3	0	3	4th Year Standing
CE 458	Construction Occupational Safety and Health	3	0	3	4th Year Standing
CE 459	Data Management in Construction	3	0	3	4th Year Standing
CE 460	Advanced Construction Methods & Equipment	3	0	3	4th Year Standing
CE 491	CE Engineering Correlation Course	3	0	3	4th Year Standing
CE 493	CE Special Topics, Seminars and Field Trips	0	1	1	4th Year Standing
	Sub- Total	16	2	18	
	Grand Total	164	259	184	

SUMMARY	Units
Technical Courses	
A. Mathematics	19
B. Natural / Physical Science	10
C. Basic Engineering Sciences	27
D. Allied Courses	6
E. Professional Courses - Common	54
E. Professional Courses	15
G. On the Job Training (240 hrs)	3
Sub-Total	134
II. Non-Technical Courses	
A. General Education Courses	24
B. GEC Elevtives / Mandated Courses	12
C. Physical Education	8
D. NSTP	6
Sub-Total	50
Grand Total	184

SURIGAO STATE COLLEGE
OF TECHNOLOGY

"For Nation's Greater Heights"

CERTIFICATE NUMBER: AJA19 0225

COLLEGE OF ENGINEERING & INFORMATION TECHNOLOGY

MONITORING SHEET
Learning Modules

By:

DR JESSICA ROSE E. FERNANDEZ
Assistant Dean, CEIT

MONITORING OF LEARNING MODULES IN BSEE

First Semester, AY 2020 - 2021

NO.	COURSE	COURSE DESCRIPTION	UNITS	SECTION	INSTRUCTOR	SUBMITTED	EVALUATED	PRODUCED
1	MATH 111	Calculus 1	5	BSEE 1	Engr Navarro	✓		
2	ES 133	Computer Aided Drafting	2	BSEE 1	Arch Solloso			
3	GE Math	Mathematics in the Modern World	3	BSEE 1	Engr Borja	✓	✓	✓
4	CHEM 121	Chemistry for Engineers, Lec/Lab	3	BSEE 1	Hugo D			
5	IC 102	Introduction to Electrical Engineering	3	BSEE 1	Engr Paglinawan			
6	MATH 113	Differential Equations	3	BSEE 2	[illegible]	✓	✓	✓
7	EE 201	Electrical Circuits 1, Lec/Lab	4	BSEE 2	Engr Liza	✓		
8	ES 255	Engineering Mechanics	3	BSEE 2	Engr Fideles	✓		
9	MATH 114	Engineering Data Analysis	3	BSEE 2	Engr Liza	✓		
10	ES 302	Fluid Mechanics	2	BSEE 2	Engr Ga Galila			
11	EE 301	Numerical Methods and Analysis, Lec/Lab	3	BSEE 3A BSEE 3B	Engr Calinawan			
12	ECE 371	Logic Circuits and Switching Theory, Lec/Lab	4	BSEE 3A BSEE 3B	Engr Pascua	✓	✓	[illegible]
13	ES 246	Environmental Science and Engineering	3	BSEE 3A BSEE 3B	Engr Paglinawan			
14	EE 311	Industrial Electronics, Lec/Lab	4	BSEE 3A BSEE 3B	Engr Ga Galila			
15	EE 312	Fundamentals of Electronics Communications	3	BSEE 3A BSEE 3B	Engr Paglinawan			
16	EE 302	Electrical Machines 1	2	BSEE 3A BSEE 3B	Engr Delosa	✓	✓	
17	ES 261	Fundamentals of Deformable Bodies	2	BSEE 3A BSEE 3B	Engr Fideles Engr Calinawan	✓		
18	MATH 112	Numerical Methods, Lec/Lab	3	BSEE 4	Engr Calinawan			
19	ES 108	Mechanics of Fluid, Lec/Lab	3	BSEE 4	Engr Navarro	✓		
20	ES 114	Engineering Materials	3	BSEE 4	Engr Acido	✓	✓	✓
21	EE 103	Circuits 3 Lec/Lab	4	BSEE 4	Engr Delosa	✓	✓	✓
22	EE 104	DC Machinery, Lec/Lab	3	BSEE 4	Engr Delosa	✓	✓	✓
23	ECE 105	Logic Circuits and Switching Theory, Lec/Lab	4	BSEE 4	Engr Pascua	✓	✓	
24	ECE 110	Principles of Communications, Lec/Lab	4	BSEE 4	Engr Mangoa	✓	✓	
25	CpE 108	Microprocessor System, Lec/Lab	4	BSEE 5	Engr Corvera	✓	✓	
26	EE 109	Instrumental and Control, Lec/Lab	3	BSEE 5	Engr Delosa	✓	✓	✓
27	EE 117	Information and Communication Technology, Lec/Lab	3	BSEE 5	Engr Paglinawan			
28	EE 125	Electrical Transmission and Distribution System, Lec/Lab	4	BSEE 5	Engr Liza	✓		
29	EE 110	Illumination Engineering Design, Lec/Lab	3	BSEE 5	Engr Liza	✓		
30	EE 111	Electrical System Design, Lec/Lab	3	BSEE 5	Engr Delosa	✓	✓	
31	EE 112	EE Project Study 1	3	BSEE 5	Engr Bacarro	✓	✓	✓
32	EE 121	EE Elective 3	3	BSEE 5	Engr Navarro	✓		

INSTRUCTIONAL MATERIALS DEVELOPMENT COMMITTEE
SSCT – OP – 06 – 10 Series 2020

Chair : Engr Richard Badiola
Member : Engr Rosanne Andaluz

MONITORING OF LEARNING MODULES IN BSIS

First Semester, AY 2020 - 2021

NO.	COURSE	COURSE DESCRIPTION	UNITS	SECTION	INSTRUCTOR	SUBMITTED	EVALUATED	PRODUCED
1	ITE 111	Introduction to Computing, Lec/Lab	3	BSIS 1	Dr Montejo	✓	✓	✓
2	ITE 112	Fundamentals of Programming, Lec/Lab	3	BSIS 1	Mr Cabanero	✓	✓	✓
3	Math Plus	Pre-Calculus	3	BSIS 1	Ms Galgo	✓	✓	✓
4	GE Math	Mathematics in the Modern World	3	BSIS 1	Ms Galgo	✓	✓	✓
5	GE LITE	Living in the IT Era	3	BSIS 1	Engr Pascua	✓	✓	✓
6	ITE 211	Data Structures and Algorithm, Lec/Lab	3	BSIS 2A BSIS 2B BSIS 2C	Dr Francisco	✓	✓	✓
7	IS 212	Professional Issues in Information Systems	3	BSIS 2A BSIS 2B BSIS 2C	~~Ms Hambre~~ Cuartero	✓	✓	✓
8	IS 213	IT Infrastructure & Network Technologies, Lec/Lab	3	BSIS 2A BSIS 2B	Ms Gallera	✓	✓	✓
9	IS 214	Organizational & Management Concepts	3	BSIS 2A BSIS 2B BSIS 2C	Ms Birao	✓	✓	✓
10	ITE 215	Installation of Hardware and Software, Lec/Lab	3	BSIS 2A BSIS 2B BSIS 2C	Mr Dumaicos	✓		
11	IS 213	IT Infrastructure & Network Technologies, Lec/Lab	3	BSIS 2C	~~Dr Montejo~~ Gallera	✓	✓	✓
12	ITE 311	System Analysis & Design, Lec/Lab	3	BSIS 3A BSIS 3B BSIS 3C BSIS 3D	Dr Cagas	✓	✓	✓
13	IS 312	Business Process Management	3	BSIS 3A BSIS 3B BSIS 3C BSIS 3D	Ms Birao	✓	✓	✓
14	IS 313	Quantitative Methods	3	BSIS 3A BSIS 3B BSIS 3C BSIS 3D	Dr Dela Cerna	✓	✓	✓
15	IS 314	IS Innovations and New Technologies	3	BSIS 3A BSIS 3B BSIS 3C BSIS 3D	Engr Noguerra	✓		
16	ITE 315	Web Based Programming and Applications, Lec/Lab	3	BSIS 3A BSIS 3B BSIS 3C BSIS 3D	Ms Reyna	✓	✓	✓
17	IS 316	Accounting	3	BSIS 3A BSIS 3B	Ms Sequerra			
18	IS 316	Accounting	3	BSIS 3C BSIS 3D	Mr Omac			
19	IS 411	Free Elective 3 (Management Information System)	3	BSIS 4	Engr Noguerra	✓		
20	IS 412	IS Elective 4 (Planning, Estimation and Project Management)	3	BSIS 4	Dr Montejo	✓	✓	
21	IS 413	Capstone Project II	3	BSIS 4	Ms Gallera	✓		
22	ElecTech	Quality Assurance	3	BSIS 4	Ms Hambre	✓		
23	IS 416	System Resource Management	3	BSIS 4	Ms Toledo	✓	✓	✓
24	IS 414	IS Special Topics and Seminars	3	BSIS 4	Dr Montejo	✓	✓	

INSTRUCTIONAL MATERIALS DEVELOPMENT COMMITTEE
SSCT – OP – 06 – 14 Series 2020

Chair : Dr Jessica Rose E. Fernandez
Member : Jovie M. Gallera
Member : Teresita L. Toledo

MONITORING OF LEARNING MODULES IN BSIT

First Semester, AY 2020 - 2021

NO.	COURSE	COURSE DESCRIPTION	UNITS	SECTION	INSTRUCTOR	SUBMITTED	EVALUATED	PRODUCED
1	ITE 111	Introduction to Computing, Lec/Lab	3	BSIT 1	Dr Montejo	✓	✓	✓
2	ITE 112	Fundamentals of Programming, Lec/Lab	2	BSIT 1	Mr Cabanero	✓	✓	
3	Math Plus	Pre-Calculus	3	BSIT 1	Ms Galgo	✓	✓	✓
4	GE Math	Mathematics in the Modern World	3	BSIT 1	Ms Galgo	✓	✓	✓
5	ITE 211	Data Structures and Algorithm, Lec/Lab	3	BSIT 2A BSIT 2B BSIT 2C	Dr Francisco	✓	✓	✓
6	IT 212	Object Oriented Programming, Lec/Lab	3	BSIT 2A BSIT 2B BSIT 2C	Mr Salubre	✓		
7	IT 213	Platform Technologies, Lec/Lab	3	BSIT 2A BSIT 2B BSIT 2C	Ms Toledo	✓	✓	✓
8	IT 214	Human Computer Interaction 2, Lec	2	BSIT 2A BSIT 2B BSIT 2C	Mr Padilla			
9	IT 214	Human Computer Interaction 2, Lab	0	BSIT 2A BSIT 2B BSIT 2C	Mr Piloton			
10	IT 215	Installation of Hardware and Software, Lec/Lab	3	BSIT 2A BSIT 2B BSIT 2C	Mr Dumalcos			
11	ITE 311	Systems Analysis & Design	3	BSIT 3A BSIT 3B BSIT 3C BSIT 3D	Dr Cagas	✓	✓	✓
12	IT 312	Networking 2, Lec/Lab	3	BSIT 3A BSIT 3B BSIT 3C BSIT 3D	Engr Ruaya	✓	✓	
13	IT 313	System Integration and Architecture 1, Lec/Lab	3	BSIT 3A BSIT 3B BSIT 3C BSIT 3D	Mr Salvador			
14	IT 314	Advanced Database System, Lec/Lab	3	BSIT 3A BSIT 3B BSIT 3C BSIT 3D	Engr Reyna			
15	IT 315	Integrative Programming and Technologies 2, Lec/Lab	3	BSIT 3A BSIT 3B BSIT 3C BSIT 3D	Er Noguerra ~~Mr Buctuan~~			
16	ITE 316	Animation and Game Development, Lec/Lab	3	BSIT 3A BSIT 3B BSIT 3C BSIT 3D	Dr Fernandez	✓	✓	✓
17	IT 411	Capstone Project II	3	BSIT 4A BSIT 4B	Ms Reyna	✓	✓	✓
18	IT 412	Network Administration	3	BSIT 4A BSIT 4B	Engr Ruaya	✓	✓	✓
19	IT 413	Free Elective 2 (Creative Computing Studies), Lec/Lab	3	BSIT 4A BSIT 4B	Ms Toledo	✓	✓	✓
20	IT 414	IT Elective 4 (Management Information System)	3	BSIT 4A BSIT 4B	Engr Noguerra	✓		
21	IT 415	Free Elective 3 (Mobile Application), Lec/Lab	3	BSIT 4A BSIT 4B	Engr Reyna			
22	IT 416	3D Animation, Lec/Lab	3	BSIT 4A BSIT 4B	Mr Cabanero	✓	✓	
23	IT 417	IT Special Topics and Seminars	3	BSIT 4A BSIT 4B	Dr Fernandez	✓	✓	✓

INSTRUCTIONAL MATERIALS DEVELOPMENT COMMITTEE

SSCT – OP – 06 – 13 Series 2020

Chair : Alma Christie C. Reyna
Member : Renz M. Buctuan
Member : Engr Ritchie A. Reyna

MONITORING OF LEARNING MODULES IN BSECE

First Semester, AY 2020 - 2021

NO.	COURSE	COURSE DESCRIPTION	UNITS	SECTION	INSTRUCTOR	SUBMITTED	EVALUATED	PRODUCED
1	MATH 111	Calculus 1	5	BSECE 1	Engr Navarro	✓		
2	GE Math	Mathematics in the Modern World	3	BSECE 1	Engr Borja	✓	✓	✓
3	CHEM 121	Chemistry for Engineers, Lec/Lab	4	BSECE 1	Dr Donoso	✓	✓	✓
4	IC 101	Introduction to Electronics Engineering	3	BSECE 1	Dr Madelo	✓	✓	✓
5	MATH 113	Differential Equations	3	BSECE 2	Engr Escabal	✓	✓	✓
6	PHYS 141	Physics 2, Lec/Lab	4	BSECE 2	Engr Fideles	✓		
7	CpE 164	Computer Programming (Object-Oriented Programming)	2	BSECE 2	Engr Gn Galia	✓	✓	
8	ES 242	Materials Science and Engineering	3	BSECE 2	Engr Liza	✓		
9	ES 246	Environmental Science and Engineering	3	BSECE 2	Engr Paglinawan			
10	EE 202	Circuits 2, Lec/Lab	4	BSECE 3	Engr Ga Galia			
11	ECE 355	Electronic Circuit Analysis and Design, Lec/Lab	4	BSECE 3	Dr Madelo	✓		
12	ECE 371	Logic Circuits and Switching Theory	3	BSECE 3	Engr Borja	✓		
13	ECE 361	Signals, Spectra, Signal Processing, Lec/Lab	4	BSECE 3	Dr Ylaya	✓	✓	
14	ECE 362	Principles of Communication Systems, Lec/Lab	4	BSECE 3	Engr Mangca	✓	✓	
15	MATH 112	Numerical Methods, Lec/Lab	4	BSECE 4	Engr Calinawan			
16	ES 114	Engineering Materials	3	BSECE 4	Engr Acido	✓	✓	✓
17	ECE 103	Electronics 3, Lec/Lab	4	BSECE 4	Dr Madelo	✓	✓	✓
18	ECE 105	Logic Circuits and Switching Theory, Lec/Lab	4	BSECE 4	Engr Escabal	✓	✓	✓
19	ECE 110	Principles of Communications	3	BSECE 4	Engr Mangca	✓	✓	
20	ECE 111	Signals, Spectra, Signal Processing, Lec/Lab	4	BSECE 4	Dr Ylaya	✓	✓	
21	ECE 119	ECE Elective 1	3	BSECE 4	Engr Fideles	✓		
22	ES 112	Engineering Economy	3	BSECE 5	Engr Acido	✓	✓	
23	ECE 108	Instrumentation and Control, Lec/Lab	3	BSECE 5	Dr Ylaya	✓	✓	
24	CpE 108	Microprocessor System, Lec/Lab	4	BSECE 5	Engr Corvera	✓	✓	
25	ECE 114	Transmissions Media and Antenna System, Lec/Lab	4	BSECE 5	Dr Ylaya	✓	✓	
26	ECE 115	Modern Communication Systems	3	BSECE 5	Engr Escabal	✓	✓	
27	ECE 121	ECE Elective 3	3	BSECE 5	Engr Escabal	✓	✓	
28	ECE 123	ECE Project Study 1	3	BSECE 5	Engr Bacarro	✓	✓	✓

INSTRUCTIONAL MATERIALS DEVELOPMENT COMMITTEE
SSCT – OP – 07 – 14 Series 2020

Chair : Dr Aurea M. Madelo
Member : Engr Robert R. Bacarro
Member : Engr Darwin C. Mangca

MONITORING OF LEARNING MODULES IN BSCS

First Semester, AY 2020 - 2021

NO.	COURSE	COURSE DESCRIPTION	UNITS	SECTION	INSTRUCTOR	SUBMITTED	EVALUATED	PRODUCED
1	ITE 111	Introduction to Computing, Lec/Lab	3	BSCS 1	Dr Montejo	✓	✓	✓
2	ITE 112	Fundamentals of Programming, Lec/Lab	3	BSCS 1	Mr Cabanero	✓	✓	
3	Math Plus	Pre-Calculus	3	BSCS 1	Ms Galgo	✓	✓	✓
4	GE Math	Mathematics in the Modern World	3	BSCS 1	Ms Galgo	✓	✓	✓
5	GE LITE	Living in the IT Era	3	BSCS 1	Engr Pascua	✓	✓	✓
6	ITE 211	Data Structures and Algorithms, Lec/Lab	3	BSCS 2	Dr Francisco	✓	✓	✓
7	CS 211	Discrete Structures 2	3	BSCS 2	Ms Galgo	✓	✓	✓
8	CS 212	Object-Oriented Programming, Lec/Lab	3	BSCS 2	Mr Salubre	✓		
9	CS 213	Human Computer Interaction, Lec/Lab	3	BSCS 2	Transferred	✓	✓	
10	CS 311	Application Development & Emerging Technologies, Lec	3	BSCS 3A BSCS 3B	Mr Padilla			
11	CS 311	Application Development & Emerging Technologies, Lab	3	BSCS 3A BSCS 3B	Mr Piloton			
12	CS 312	Automata Theory and Formal Languages	3	BSCS 3A BSCS 3B	Transferred	✓	✓	
13	CS 313	Information Assurance and Security	3	BSCS 3A BSCS 3B	Ms Gallera	✓	✓	✓
14	CS 314	Software Engineering 1, Lec/Lab	3	BSCS 3A BSCS 3B	Engr Noguerra	✓		
15	CS 315	Elective 2 (Intelligent System), Lec/Lab	3	BSCS 3A BSCS 3B	~~Mr Buctuan~~			
16	CS 316	Quantitative Methods (incldg. Modeling & Simulation), Lec/Lab	3	BSCS 3A BSCS 3B	Dr Dela Cerna	✓	✓	✓

INSTRUCTIONAL MATERIALS DEVELOPMENT COMMITTEE
SSCT – OP – XX – XX Series 2020

Chair : Dr Monalee A. dela Cerna
Member : Dr Vernille Francisco

MONITORING OF LEARNING MODULE IN BSCpE

First Semester, AY 2020 - 2021

NO.	COURSE	COURSE DESCRIPTION	UNITS	SECTION	INSTRUCTOR	SUBMITTED	EVALUATED	PRODUCED
1	MATH 111	Calculus 1	5	BSCpE 1	Engr Acido	✓	✓	✓
2	GE Math	Mathemtaics in the Modern World	3	BSCpE 1	Engr Borja	✓	✓	✓
3	CpE 162	Programming Logic and Design	2	BSCpE 1	Engr Corvera	✓	✓	✓
4	CHEM 121	Chemistry for Engineers, Lec/Lab	4	BSCpE 1	Dr Donoso	✓	✓	✓
5	CpE 141	Computer Engineering as a Discipline	3	BSCpE 1	Dr Morite	✓	✓	
6	MATH 113	Differential Equations	3	BSCpE 2	Panganduyon	✓	✓	✓
7	CpE 263	Data Structures and Algorithms	2	BSCpE 2	Engr Gh Galila	✓	✓	
8	ECE 241	Fundamentals of Electrical Circuits, Lec/Lab	4	BSCpE 2	Dr Madelo	✓	✓	✓
9	ES 113	Computer-Aided Drafting, Lec/Lab	2	BSCpE 2	Arch Solloso			
10	ES 137	Engineering Economics	3	BSCpE 2	Engr Acido	✓	✓	✓
11	CpE 372	Logic Circuits and Design, Lec/Lab	4	BSCpE 3	Engr Borja	✓	✓	
12	CpE 361	Computer Engineering Drafting and Design	1	BSCpE 3	Arch Solloso			
13	CpE 366	Introduction to HDL, Lec/Lab	2	BSCpE 3	Engr Cerdan			
14	CpE 373	Operating Systems	3	BSCpE 3	Engr Pascua	✓	✓	
15	CpE 375	Data and Digital Communications	3	BSCpE 3	Engr Gh Galila	✓	✓	
16	CpE 378	Feedback and Control Systems	3	BSCpE 3	Engr Fideles			
17	CpE 379	Fundamentals of Mixed Signals and Sensors	3	BSCpE 3	Engr Corvera	✓		
18	ES 139	Engineering Management	3	BSCpE 3	Engr Acido	✓	✓	✓
19	MATH 112	Numerical Methods, Lec/Lab	4	BSCpE 4	Engr Calinawan			
20	CpE 103	Object Oriented Programming, Lec/Lab	3	BSCpE 4	Engr Gh Galila	✓	✓	
21	CpE 104	Digital Signal Processing, Lec/Lab	4	BSCpE 4	Engr Cerdan			
22	CpE 105	Operating Systems, Lec/Lab	4	BSCpE 4	Engr Pascua	✓	✓	
23	ECE 106	Advanced Logic Circuit, Lec/Lab	4	BSCpE 4	Engr Corvera	✓	✓	
24	ECE 110	Principle of Communications, Lec/Lab	4	BSCpE 4	Engr Mangca	✓	✓	
25	CpE 113	Data Communication and Networking 1, Lec/Lab	4	BSCpE 4	Engr Borja	✓	✓	
26	ES 112	Engineering Economy	3	BSCpE 5	Engr Acido	✓	✓	✓
27	CpE 110	Computer System Architecture w/ Interfacing Technique, Lec/Lab	4	BSCpE 5	Engr Pascua	✓	✓	
28	CpE 107	System Analysis & Design, Lec/Lab	3	BSCpE 5	Dr Morite	✓	✓	✓
29	CpE 115	Data Communication and Networking 3, Lec/Lab	4	BSCpE 5	Engr Corvera	✓		
30	CpE 118	Elective 2	3	BSCpE 5	Dr Morite	✓	✓	✓
31	CpE 119	Elective 3	3	BSCpE 5	Dr Morite	✓	✓	✓
32	CpE 121	CpE Project Study 1	3	BSCpE 5	Dr Morite	✓	✓	

INSTRUCTIONAL MATERIALS DEVELOPMENT COMMITTEE
SSCT – OP – 06 – 11 Series 2020

Chair : Dr Unife O. Cagas
Member : Engr Gracechell M. Pascua
Member : Dr Anayln S. Morite

MONITORING OF LEARNING MODULES IN BSCE

First Semester, AY 2020 - 2021

NO.	COURSE	COURSE DESCRIPTION	UNITS	SECTION	INSTRUCTOR	SUBMITTED	EVALUATED	PRODUCED
1	MATH 111	Calculus 1	5	BSCE 1	Engr Navarro	✓	✓	✓
2	GE Math	Mathematics in the Modern World	3	BSCE 1	Engr Borja	✓	✓	✓
3	CHEM 121	Chemistry for Engineers Lec/Lab	4	BSCE 1	Dr Donoso	✓	✓	✓
4	ES 130	Civil Engineering Orientation	3	BSCE 1	Engr Portugues	✓	✓	✓
5	ES 134	Statics of Rigid Bodies	3	BSCE 2A BSCE 2B	Engr Fideles			
6	CE 245	Fundamentals of Surveying, Lec/Lab	4	BSCE 2A BSCE 2B	Engr [illegible]			
7	ES 137	Engineering Economics	3	BSCE 2A BSCE 2B	Engr Acido	✓	✓	✓
8	ES 141	Engineering Utilities 1 (Basic EE)	3	BSCE 2A BSCE 2B	Arch Solloso			
9	ES 142	Engineering Utilities 2 (Basic ME)	3	BSCE 2A BSCE 2B	Arch Potente			
10	MATH 113	Differential Equations	3	BSCE 2A BSCE 2B	Dr Panganduyon	✓	✓	✓
11	CE 360	Structural Theory, Lec/lab	3	BSCE 3A BSCE 3B BSCE 3C	Engr Jumawan	✓	✓	
12	CE 351	Construction Materials & Testing, Lec/Lab	3	BSCE 3A BSCE 3B BSCE 3C	Dr Andaluz	✓	✓	✓
13	CE 346	Highway and Railroad Engineering	3	BSCE 3A BSCE 3B BSCE 3C	Dr Andaluz	✓	✓	✓
14	MATH 115	Numerical Solutions to CE Problems Lec/Lab	3	BSCE 3A BSCE 3B BSCE 3C	Engr Badiola	✓	✓	
15	ES 133	Computer-Aided Drafting	1	BSCE 3A BSCE 3B BSCE 3C	Arch Solloso			
16	CE 354	Building Systems Design, Lec/Lab	3	BSCE 3A BSCE 3B BSCE 3C	Arch Potente			
17	MATH 112	Numerical Methods	3	BSCE 4	Engr [illegible]			
18	ES 108	Mechanics of Fluid	3	BSCE 4	Engr Ga Galla ?			
19	CE 105	Highway Engineering	3	BSCE 4	Engr Pejan			
20	CE 109	Building Design 1	3	BSCE 4	Arch Potente			
21	CE 111	Geotechnical Engineering 1 (Soil Mechanics)	3	BSCE 4	Engr Badiola	✓	✓	
22	CE 113	Construction Materials & Testing	2	BSCE 4	Engr Portugues	✓	✓	✓
23	CE 114	Structural Theory 1, Lec/Lab	4	BSCE 4	Engr Jumawan	✓	✓	
24	CE 118	Water Resources Engineering	3	BSCE 5A BSCE 5B	Dr Andaluz	✓	✓	✓
25	CE 112	Geotechnical Engineering II (Foundation Engineering), Lec/Lab	4	BSCE 5A BSCE 5B	Engr Badiola	✓	✓	✓
26	CE 120	Structural Design II (Reinforced Concrete 2), Lec/Lab	4	BSCE 5A BSCE 5B	Engr Orit	✓	✓	✓
27	CE 121	Structural Design III (Steel Design), Lec/Lab	4	BSCE 5A	Engr Donoso			
28	CE 123	Construction Methods and Project Management, Lec/Lab	4	BSCE 5A BSCE 5B	Engr Pejan			
29	CE 126	CE Elective 2	3	BSCE 5A BSCE 5B	Engr Balberan			
30	CE 129	Civil Engineering Project 1	3	BSCE 5A BSCE 5B	Engr Bacarro	✓	✓	✓
31	CE 121	Structural Design III (Steel Design), Lec/Lab	4	BSCE 5B	Engr Gegona			

INSTRUCTIONAL MATERIALS DEVELOPMENT COMMITTEE
SSCT – OP – 06 – 10 Series 2020

Chair : Engr Richard Badiola
Member : Engr Rosanne Andaluz

Module no. 1
Obtaining Data

Topic: 1.1. Methods of Data Collection
1.1.1 Retrospective Study
1.1.2 Observational Study
1.1.3 Designed Experiments
1.2. Planning and Conducting Surveys
1.2.1 Sampling Methods
1.2.2 Sources of Bias in Sampling and Surveys
1.3. Planning and Conducting Experiments: Introduction to Design of Experiments
1.3.1 Strategy of Experimentation
1.3.2 Mechanistic and Empirical Model

Time Frame: 2 hours

Introduction:
Historically, measurements were obtained from a sample of people and generalized to a population, and the terminology has remained. Sometimes the data are all of the observations in the population. This results in a census. However, in the engineering environment, the data are almost always a sample that has been selected from the population. Three basic **methods** of **collecting data** are

- A **retrospective study** using historical data
- An **observational study**
- A **designed experiment**

An effective data-collection procedure can greatly simplify the analysis and lead to improved understanding of the population or process that is being studied. We now consider some examples of these data-collection methods.

Objectives:
At the end of this topic, the students should be able to
1. Discuss the different methods that engineers use to collect data;
2. Describe the different methods of sampling in planning and conducting surveys;
3. Identify the advantages that designed experiments have in comparison to other methods of collecting engineering data.

Pre – Test

Module 1 – Obtaining Data

Name: **Subject:**
Course/Section: **Date:**

Direction: Read the questions carefully.

1. What are three methods of collecting data?
2. What are the differences between population and sample?
3. What is the difference between mechanistic and empirical model?

Learning Activities:

1.1 Methods of Data Collection

1.1.1 Retrospective Study

Montgomery, Peck, and Vining (2012) describe an acetone-butyl alcohol distillation column (A distillation column is an essential item used in the distillation of liquid mixtures to separate the mixture into its component parts, or fractions, based on the differences in volatilities) for which concentration of acetone in the distillate (the output product stream) is an important variable. Factors that may affect the distillate are the reboil temperature, the condensate temperature, and the reflux rate. Production personnel obtain and archive the following records:

- The concentration of acetone in an hourly test sample of output product
- The reboil temperature log, which is a record of the reboil temperature over time
- The condenser temperature controller log
- The nominal reflux rate each hour

The reflux rate should be held constant for this process. Consequently, production personnel change this very infrequently.

A retrospective study would use either all or a sample of the historical process data archived over some period of time. The study objective might be to discover the relationships among the two temperatures and the reflux rate on the acetone concentration in the output product stream. However, this type of study presents some problems:

1. We may not be able to see the relationship between the reflux rate and acetone concentration because the reflux rate did not change much over the historical period.
2. The archived data on the two temperatures (which are recorded almost continuously) do not correspond perfectly to the acetone concentration measurements (which are made hourly). It may not be obvious how to construct an approximate correspondence.
3. Production maintains the two temperatures as closely as possible to desired targets or set points. Because the temperatures change so little, it may be difficult to assess their real impact on acetone concentration.
4. In the narrow ranges within which they do vary, the condensate temperature tends to increase with the reboil temperature. Consequently, the effects of these two process variables on acetone concentration may be difficult to separate.

As you can see, a retrospective study may involve a significant amount of *data*, but those data may contain relatively little useful *information* about the problem. Furthermore, some of the relevant data may be missing, there may be transcription or recording errors resulting in *outliers* (or unusual values), or data on other important factors may not have been collected and archived.

1.1.2 Observational Study

In an observational study, the engineer observes the process or population, disturbing it as little as possible, and records the quantities of interest. Because these studies are usually conducted for a relatively short time period, sometimes variables that are not routinely measured can be included. In the distillation column, the engineer would design a form to record the two temperatures and the reflux rate when acetone concentration measurements are made. It may even be possible to measure the input feed stream concentrations so that the impact of this factor could be studied.

Generally, an observational study tends to solve problems 1 and 2 and goes a long way toward obtaining accurate and reliable data. However, observational studies may not help resolve problems 3 and 4.

1.1.3 Designed Experiments

In a designed experiment, the engineer makes *deliberate* or *purposeful changes* in the controllable variables of the system or process, observes the resulting system output data, and then makes an inference or decision about which variables are responsible for the observed changes in output performance. The nylon connector example below illustrates a designed experiment; that is, a deliberate change was made in the connector's wall thickness with the objective of discovering whether or not a stronger pull-off force could be obtained. Experiments designed with basic principles such as *randomization* are needed to establish *cause-and-effect* relationships.

Example:

Suppose that an engineer is designing a nylon connector to be used in an automotive engine application. The engineer is considering establishing the design specification on wall thickness at 3⁄32 inch but is somewhat uncertain about the effect of this decision on the connector pull-off force. If the pull-off force is too low, the connector may fail when it is installed in an engine. Eight prototype units are produced and their pull-off forces measured, resulting in the following data (in pounds): 12.6, 12.9, 13.4, 12.3, 13.6, 13.5, 12.6, 13.1. As we anticipated, not all of the prototypes have the same pull-off force. We say that there is variability in the pull-off force measurements.

Much of what we know in the engineering and physical-chemical sciences is developed through testing or experimentation. Designed experiments play a very important role in engineering design and development and in the improvement of manufacturing processes.

1.2 Planning and Conducting Surveys

Planning and conducting surveys are useful in describing the characteristics of a large population to ensure accurate sample in gathering targeted results to draw conclusions and make important decisions.

Population

A population is the entire group of individuals, scores, measurements, etc. about which we want information.

Sample

The part of the population from which we actually collect information and is used to draw conclusions about the whole.

Random Selection

A process of gathering a representative sample for a particular study. Random means the people are chosen by chance, each person has the same probability of being chosen.

1.2.1 Sampling Methods

There are two types of sampling methods:

- *Probability sampling* involves random selection, allowing you to make statistical inferences about the whole group.
- *Non-probability sampling* involves non-random selection based on convenience or other criteria, allowing you to easily collect initial data.

Probability sampling methods:

1. *Simple Random Sampling* – all members of a population has an equal chance of being selected in which bias is avoided. You can use tools like random number generators or other techniques that are based entirely on chance when conducting this type of sampling.
2. *Systematic Sampling* – similar to simple random sampling, but is usually slightly easier to conduct. Every member of the population is listed with a number and individuals are chosen at regular intervals instead of randomly generating numbers.
3. *Stratified Random Sampling* – the population is divided into subgroups (strata) so that subjects within the same subgroup share the same characteristics (e.g. gender, age) then a sample is drawn from each.
4. *Cluster Sampling* – involves dividing the population into sections (clusters), but each section should have similar characteristics to the whole sample. Some of those clusters are then randomly selected and then chooses all members of the selected clusters.

Non-probability sampling methods:

1. *Convenience sampling* – an easy and inexpensive way to gather initial data where individuals who happen to be most accessible to the researcher are included but there is no way to tell if the sample is representative of the population, so it can't produce generalizable results.
2. *Voluntary response sampling* – mainly based on ease of access. People volunteer themselves (e.g. by responding to a public online survey) instead of the researcher choosing participants and directly contacting them.
3. *Purposive sampling* – involves the researcher using their judgment to select a sample that is most useful to the purposes of the research.
4. *Snowball sampling* – used to recruit participants via other participants if the population is hard to find. Just like a snowball increasing in size (sample size), the sampling technique can go on and on until the researcher has enough data to analyze and draw conclusions.

1.2.2 Sources of Bias in Sampling and Surveys

The two common methods of collecting data that usually produce biased results are

1. *Convenience Samples* where there is selection of individuals that are easiest to reach.
2. *Voluntary Response Samples* where respondents decide if they want to be included in a survey.

Often, physical laws (such as Ohm's law and the ideal gas law) are applied to help design products and processes. We are familiar with this reasoning from general laws to specific cases. But it is also important to reason from a specific set of measurements to more general cases to answer the previous questions. This reasoning comes from a sample (such as the eight connectors) to a population (such as the connectors that will be in the products that are sold to customers). The reasoning is referred to as *statistical inference*. See Figure 2.1. Clearly, reasoning based on measurements from some objects to measurements on all objects can result in errors (called *sampling errors*). However, if the sample is selected properly, these risks can be quantified and an appropriate sample size can be determined.

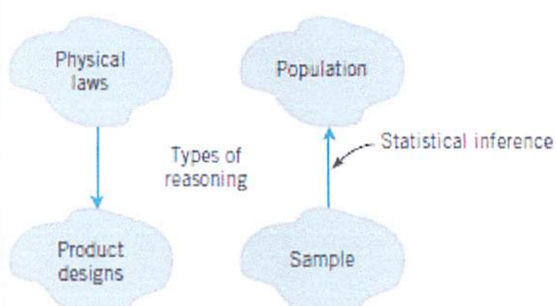


Figure 2.1 Statistical inference is one type of reasoning.

1.3 Planning and Conducting Experiments: Introduction to Design of Experiments

Experiments are used to study the performance of processes and systems.

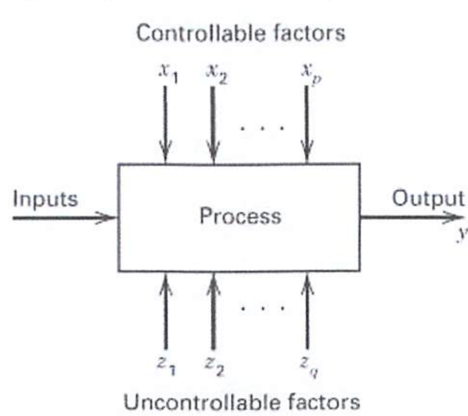


Figure 3.1

The objectives of the experiment may include:

1. Determining which variables are most influential on *y*.
2. Determining where to set the influential x's such that
   - y is almost always near the desired nominal value
   - variability in *y* is small
   - the effects of $z_1, \ldots, z_p$ are minimized

Experiments often involve several factors.

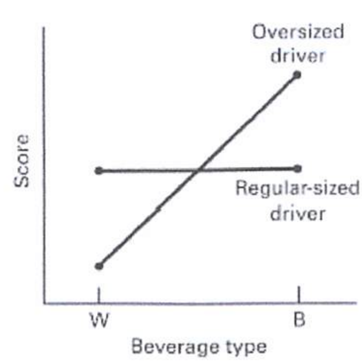
Example:
In a golf experiment all possible combinations of factor levels are tested such as the following:

- Type of driver
- Type of ball
- Walking vs. riding
- Type of beverage
- Time of round
- Weather
- Type of golf spike
- Etc

1.3.1 Strategy of experimentation: To planning and conducting the experiment

1. Best-guess approach:
   - frequently used in practice
   - often works reasonably well
   - often have great deal of technical or theoretical knowledge of the system
   - disadvantage: spend time to guess the initial best-guess; no guarantee that the best solution has been found

2. One-factor-at-a-time(OFAT)
   - Used extensively in practice
   - disadvantage: fails to consider interaction between the factors and less efficient



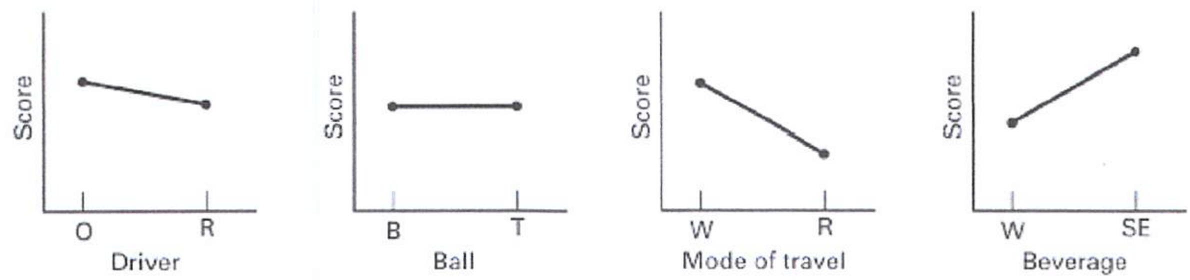


Figure 3.2 OFAT

3. Factorial experiment: factors are varied together
   - extremely important
   - all possible combinations of the factors across their levels are used in the design
   - enable to investigate the individual effects of each factor and to determine whether the factors interact

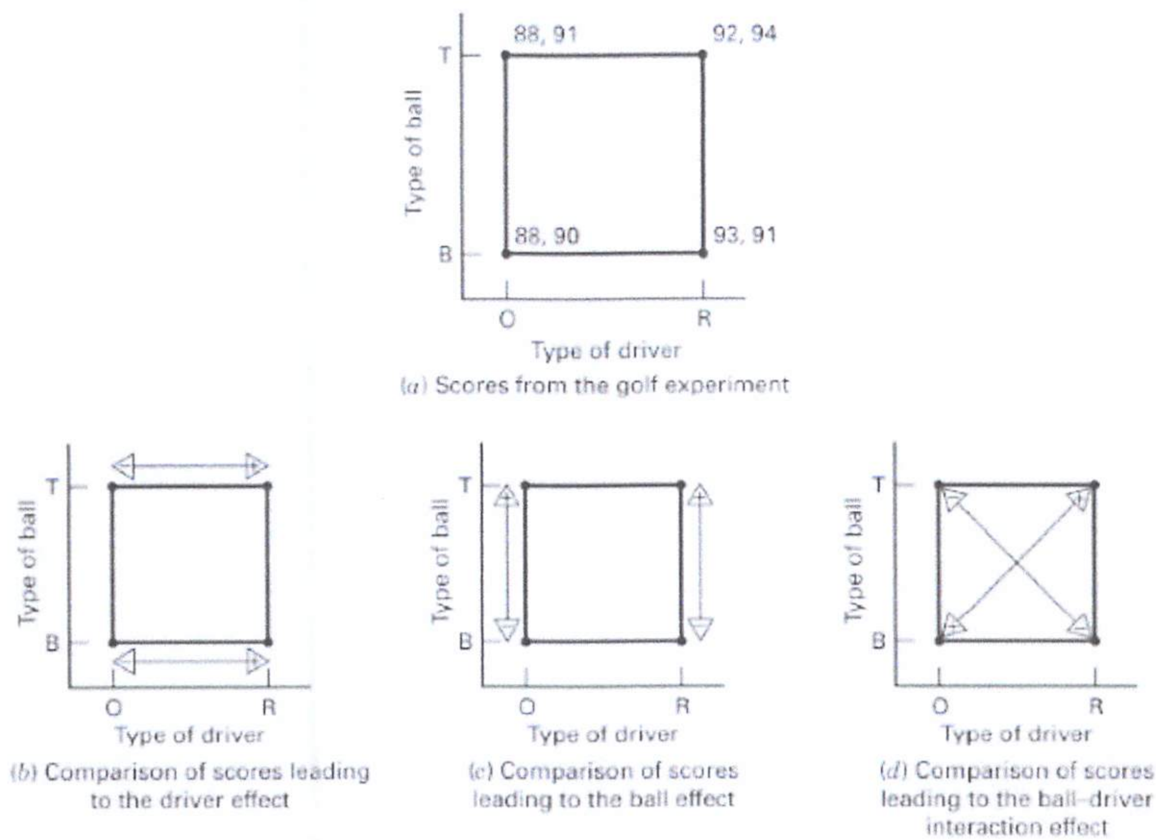


Figure 3.3 2^2 factorial design: two factors; each at two levels

Consider again the problem involving the choice of wall thickness for the nylon connector. This is a simple illustration of a designed experiment. The engineer chose two wall thicknesses for the connector and performed a series of tests to obtain pull-off force measurements at each wall thickness.

Designed experiments offer a very powerful approach to studying complex systems, such as the distillation column (section 1.1). This process has three factors—the two temperatures and the reflux rate—and we want to investigate the effect of these three factors on output acetone concentration. A good experimental design for this problem must ensure that we can separate the effects of all three factors on the acetone concentration. The specified values of the three factors used in the experiment are called *factor levels*. Typically, we use a small number of levels such as two or three for each factor. For the distillation column problem, suppose that we use two levels, "high" and "low" (denoted +1 and −1, respectively), for each of the three factors. A very reasonable experiment design strategy uses every possible combination of the factor levels to form a basic experiment with eight different settings for the process. See Table 1.1 for this experimental design.

Figure 3.4 illustrates that this design forms a cube in terms of these high and low levels. With each setting of the process conditions, we allow the column to reach equilibrium, take a sample of the product stream, and determine the acetone concentration. We then can draw specific inferences about the effect of these factors. Such an approach allows us to proactively study a population or process.

An important advantage of factorial experiments is that they allow one to detect an *interaction* between factors. Consider only the two temperature factors in the distillation experiment. Suppose that the response concentration is poor when the reboil temperature is *low*, regardless of the condensate temperature. That is, the condensate temperature has no effect when the reboil temperature is *low*. However, when the reboil temperature is *high*, a *high* condensate temperature generates a good response, but a *low* condensate temperature generates a poor response. That is, the condensate temperature changes the response when the reboil temperature is *high*. The effect of condensate temperature depends on the setting of the reboil temperature, and these two factors are said to interact in this case.

TABLE 1.1 The Designed Experiment (Factorial Design) for the Distillation Column

Reboil Temp.	Condensate Temp.	Reflux Rate
−1	−1	−1
+1	−1	−1
−1	+1	−1
+1	+1	−1
−1	−1	+1
+1	−1	+1
−1	+1	+1
+1	+1	+1