CLS 108– APPLIED CALCULUS

Number of Credit Hours:	☑ 3 credits	❑ 4 credits	
Number of Lecture Hours per Week :	❑ 1 hour	❑ 2 hours	☑ 3 hours
Number of Lab Hours per Week:	☑ none	❑ 2 hours	❑ 3 hours
Number of Tutorial Hours per Week:	☑ none	❑ 1 hour	❑ 2 hours

Catalog Description: This course reviews areas of basic mathematics such as trigonometry, analytical geometry in two dimensions, linear equations, functions and their graphs, derivatives and its geometric interpretation, simple integration and its application. (Problems will be focused on the following areas: Food nutrition, information technology, environmental sciences, etc.). .

Prerequisites*:* ELU 106

Prerequisites by Topics: Fluency in English language – comprehension, reading and writing.

Text book*:*
- Applied Calculus, S. Waner & S.R. Costenoble, Cengage Learning, Recent Edition

References:
- Calculus and its Applications Goldstein/Schneider/ Lay/Asmar, Pearson, Recent Edition

Assessment Plan for the Course:

Midterm Exams 2x	40 %
Quizzes	15 %
Assignments	NA
Home works	5 %
Project/Report/ Presentations	NA
Lab	NA
Final Exam	40 %
Total	**100 %**

Major Topics Covered in the Course:

Unit	Topic	No of teaching hours
1.	Functions and linear models. Function terminology, linear functions and linear models.	5
2.	Nonlinear models. Quadratic, exponential, logarithmic, trigonometric functions	7
3.	Introduction to the derivative. Limits, average rate of change; numerical, algebraic viewpoint of the derivative; derivative of elementary functions, sums, differences and constant multiples.	6

4.	Techniques of differentiation. The product and quotient rules, the chain rule, the derivative of logarithmic, exponential, trigonometric functions; implicit differentiation.	6
5.	Applications of the derivative . Local maximum and minimum, inflection points, graph sketching, optimization problems.	6
6.	The integral. The definite integrals, substitution, the definite integrals as sums, as areas; the fundamental theorem of calculus.	6
7.	Further integration techniques and applications of integrals. Area between curves, the average value of a function.	3
8.	Functions of several variables. Functions of several variables, and the partial derivatives.	3

Course Learning Outcomes:

Upon completion of the course, students will be able to:

C1   Use elementary functions in modeling real-life situations
C2   Comprehend the role of derivative as instantaneous rate of change and its meaning in dynamics of processes
C3   Conduct the principal techniques of differentiation and apply them in investigation of functions behavior
C4   Apply basic techniques of integration to solve standard type of problems
C5   Deploy differentiation techniques in more complex problems involving functions of several variables

Relationship between Course Learning Outcomes and Student Outcomes:

Course Learning Outcomes	Unit of the syllabus	Possible artifacts	Level	Student Outcomes
C1	Unit 1,2	Midterm 1	L	(1)
C2	Unit 3,4,5	Midterm 2	L	(1)
C3	Unit 3,4,5	Midterm 2	L	(1)
C4	Unit 6,7	Final Exam	L	(1)
C5	Unit 8	Final Exam	L	(1)

- Level of emphasis for an outcome is determined based on the weight as follows:
  - A CLO is ranked Low (L), if the CLO covers less than 10 % of course syllabus
  - A CLO is ranked Medium (M), if CLO covers 10 – 20 % of course syllabus
  - CLO is ranked High (H), if CLO covers more than 20 % of course syllabus

Estimate Curriculum Category Content (Semester hours)

Area	Core	Advanced	Area	Core	Advanced
Modern Programming Language			Networking and Data Communications		
Data Management			Systems Analysis and Design		
Role of IS in an Organization			Quantitative Analysis	3	
Information Systems Environment			Others (specify *)		

(*) Knowledge domain description

Area	Semester hours
GE	

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Revised by: ISC Curriculum committee in Oct 2019

ISC STUDENT OUTCOMES:

The program enables students to achieve, by the time of graduation:
1) *An ability to Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions*

2) *An ability to design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.*

3) *An ability to communicate effectively in a variety of professional contexts.*

4) *An ability to recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.*

5) *An ability to function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.*

6) *An ability to support the delivery, use, and management of information systems within an information systems environment.*