

Tamkang University Academic Year 111, 1st Semester Course Syllabus

Course Title	CALCULUS	Instructor	YAO CHENG
Course Class	TEIDB1A DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION ENGINEERING (ENGLISH-TAUGHT PROGRAM), 1A	Details	<ul style="list-style-type: none"> ◆ General Course ◆ Required ◆ One Semester
Relevance to SDGs	SDG4 Quality education		
Departmental Aim of Education			
<ul style="list-style-type: none"> I. Comprehend professional knowledge. II. Acquire mastery of Practical Skills. III. Establish creative achievement. 			
Subject Departmental core competences			
<ul style="list-style-type: none"> A. Programming and application ability.(ratio:15.00) B. Mathematical reasoning ability.(ratio:40.00) C. Implementing computer systems ability.(ratio:15.00) D. Computer networking application skills.(ratio:15.00) E. Professional skills for information technology (IT) industry.(ratio:15.00) 			
Subject Schoolwide essential virtues			
<ul style="list-style-type: none"> 1. A global perspective. (ratio:5.00) 2. Information literacy. (ratio:20.00) 3. A vision for the future. (ratio:10.00) 4. Moral integrity. (ratio:20.00) 5. Independent thinking. (ratio:30.00) 6. A cheerful attitude and healthy lifestyle. (ratio:5.00) 7. A spirit of teamwork and dedication. (ratio:5.00) 8. A sense of aesthetic appreciation. (ratio:5.00) 			

Course Introduction	<p>This is one semester course to the calculus. However, we will cover as much as topics as we can. We will learn the concept of limit and continuity. We will learn the formal definition of derivatives and the techniques to find the derivatives of given functions. We will apply the derivatives to find the absolute values of given functions. We will learn the formal definition of integrations and the techniques to obtain (in)definite integrals of given functions. We will apply integrations to find areas and volumes associated to given functions. We will also learn power series.</p>
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The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

- I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.
- II. Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.
- III. Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
1	The aim of this course it to cover as much topics in the calculus as possible	Cognitive

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDE	12345678	Lecture	Testing, Study Assignments

Course Schedule

Week	Date	Course Contents	Note
1	111/09/05 ~ 111/09/11	1.5: The Limit of a Function, 1.6: Calculating Limits Using the Limit Laws, 1.7 The Precise Definition of a Limit, 1.8 Continuity	
2	111/09/12 ~ 111/09/18	2.1: Derivatives and Rates of Change, 2.2: The Derivative as a Function, 2.3: Differentiation formula	
3	111/09/19 ~ 111/09/25	2.4: Derivatives of Trigonometric Functions, 2.5: The Chain Rule, 2.6: Implicit Differentiation	

4	111/09/26 ~ 111/10/02	3.1: Maximum and Minimum Values, 3.2: The Mean Value Theorem 3.3: How Derivatives Affect the Shape of a Graph, 3.4: Limits at Infinity; Horizontal Asymptotes 3.5: Summary of Curve Sketching	
5	111/10/03 ~ 111/10/09	3.6: Optimization Problems, 3.8 Antiderivatives, 4.1: Areas and Distances, 4.2: The Definite Integral, 4.3: The Fundamental Theorem of Calculus, 4.4 Indefinite Integral	
6	111/10/10 ~ 111/10/16	4.5: The Substitution Rule, 5.1: Areas Between Curves 5.2: Volumes, 5.3: Volumes by Cylindrical Shells, 5.5 Average value of a Function	
7	111/10/17 ~ 111/10/23	6.1: Inverse Functions and Their Derivative, 6.2 Natural Logarithms Function, 6.3 Natural Exponential Function, 6.4 General Logarithms and Exponential Function	
8	111/10/24 ~ 111/10/30	6.6 Inverse Trigonometric Functions 6.7 Indeterminate Forms and l'Hospital's Rule	
9	111/10/31 ~ 111/11/06	7.1: Integration by Parts 7.2: Trigonometric Integrals 7.3: Trigonometric Substitution	
10	111/11/07 ~ 111/11/13	Midterm Exam Week	
11	111/11/14 ~ 111/11/20	7.4: Integration of Rational Functions by Partial Fractions 7.7: Improper Integrals	
12	111/11/21 ~ 111/11/27	10.1: Sequences 10.2: Series 10.3: The Integral Test and Estimates of Sums 10.4: The Comparison Tests 10.5: Alternating Series 10.6: Absolute Convergence and the Ratio and Root Tests 10.7: Strategy for Testing Series	
13	111/11/28 ~ 111/12/04	10.8: Power Series 10.9: Representations of Functions as Power Series 10.10: Taylor and Maclaurin Series	
14	111/12/05 ~ 111/12/11	12.1: Functions of Several Variables 12.2: Limits and Continuity 12.3: Partial Derivatives	
15	111/12/12 ~ 111/12/18	12.4: Tangent Planes and Linear Approximations 12.5: The Chain Rule 12.6: Directional Derivatives and the Gradient Vector	
16	111/12/19 ~ 111/12/25	12.7: Maximum and Minimum Values 12.8: Lagrange Multipliers	
17	111/12/26 ~ 112/01/01	13.1: Double Integrals over Rectangles 13.2: Double Integrals over General Regions	
18	112/01/02 ~ 112/01/08	Final Exam Week	

Requirement	
Teaching Facility	(None)
Textbooks and Teaching Materials	Essential Calculus,metric edition 2e,(2022)James Stewart,Daniel K.Clegg,Saleem Watson, Cengage Learning.
References	
Number of Assignment(s)	(Filled in by assignment instructor only)
Grading Policy	<p>◆ Attendance : % ◆ Mark of Usual : 40.0 % ◆ Midterm Exam : 30.0 %</p> <p>◆ Final Exam : 30.0 %</p> <p>◆ Other < > : %</p>
Note	<p>This syllabus may be uploaded at the website of Course Syllabus Management System at http://info.ais.tku.edu.tw/csp or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/CS/main.php .</p> <p>※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.</p>