



Course Specifications

| | |
|----------------------|------------------------------------|
| Course Title: | Calculus (1) |
| Course Code: | 202261-3 |
| Program: | Bachelor in Information Technology |
| Department: | Department of Mathematics |
| College: | College of Science |
| Institution: | Taif University |

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A. Course Identification

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|--|
| 1. Credit hours: 3 |
| 2. Course type |
| a. University <input type="checkbox"/> College <input checked="" type="checkbox"/> Department <input type="checkbox"/> Others <input type="checkbox"/> |
| b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/> |
| 3. Level/year at which this course is offered: 4/2 |
| 4. Pre-requisites for this course (if any): NON |
| 5. Co-requisites for this course (if any): NON |

6. Mode of Instruction (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|----|-----------------------|---------------|------------|
| 1 | Traditional classroom | 5 | 100% |
| 2 | Blended | 0 | 0 |
| 3 | E-learning | 0 | 0 |
| 4 | Distance learning | 0 | 0 |
| 5 | Other | 0 | 0 |

7. Contact Hours (based on academic semester)

| No | Activity | Contact Hours |
|----|-------------------|---------------|
| 1 | Lecture | 50 |
| 2 | Laboratory/Studio | 0 |
| 3 | Tutorial | 0 |
| 4 | Others (specify) | 0 |
| | Total | 50 |

B. Course Objectives and Learning Outcomes

| |
|--|
| <p>1. Course Description</p> <p>This course teaches the concepts and techniques of limits, differentiation and integration and their application to problems in science and engineering</p> |
| <p>2. Course Main Objective</p> <ol style="list-style-type: none"> Students should be able to work with functions represented in a variety of ways graphical, numerical, analytic, or verbal. They should understand the connections among these representations, understand the meaning of the derivative in terms of a rate of change and local linear approximation, and should be able to use derivatives to solve a variety of problems, understand the meaning of the definite integral both as a limit of Riemann sums and as the net accumulation of change, and should be able to use integrals to solve a variety of problems, understand the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus, be able to communicate mathematics and explain solutions to problems both verbally and in written sentences, be able to model a written description |



of a physical situation with a function, a differential equation, or an integral, be able to use technology to help solve problems, experiment, interpret results, and support conclusions, be able to determine the reasonableness of solutions, including sign, size, relative accuracy, and units of measurement and develop an appreciation of calculus as a coherent body of knowledge and as a human accomplishment.

3. Course Learning Outcomes

| CLOs | | Aligned PLOs |
|------|--|--------------|
| 1 | Knowledge and Understanding | |
| 2 | Skills : | |
| 2.1 | Evaluate the limit of a function and use the result to determine whether a function is continuous discontinuous has vertical asymptotes horizontal asymptotes...etc... | S1 |
| 2.2 | Compute the first and second derivative of a function and use them to determine the intervals where the function is increasing decreasing concave up concave down and to find its maxima minima inflection points and to sketch its graph. | S1 |
| 2.3 | Compute the indefinite and/or definite integral of elementary functions. | S1 |
| 3 | Values: | |

C. Course Content

| No | List of Topics | Contact Hours |
|--------------|--|---------------|
| 1 | Review of Algebra and Trigonometry | 3 |
| 2 | The Limit of A function, Calculating Limits Using The Limit Laws | 2 |
| 3 | Limits at Infinity ; Horizontal Asymptotes, Continuity | 5 |
| 4 | Derivatives and Rates of Change. The derivative as a Function | 5 |
| 5 | Derivatives of Polynomials and Exponential functions. The Product and Quotient Rules | 5 |
| 6 | Derivatives of Trigonometric Functions. The Chain Rule | 5 |
| 7 | Implicit Differentiation. Derivatives of Logarithmic Functions | 5 |
| 8 | Maximum and Minimum Values. The Mean Value Theorem | 5 |
| 9 | How Derivatives Affect the Shape of a Graph. Indeterminate Forms ; LHospitals Rule | 5 |
| 10 | Summary of Curve Sketching. Areas and Distances | 5 |
| 11 | The Definite Integral. The Fundamental Theorem of Calculus | 5 |
| 12 | Indefinite Integrals and the Net Change Theorem. The Substitution Rule | 5 |
| Total | | 50 |

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------|------------------------------------|---------------------|--------------------|
| 1.0 | Knowledge and Understanding | | |
| 2.0 | Skills | | |



| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|------|--|----------------------------|--------------------------|
| 2.1 | Evaluate the limit of a function and use the result to determine whether a function is continuous discontinuous has vertical asymptotes horizontal asymptotes...etc... | Lecture Problem Solving | Written Exams Quizzes |
| 2.2 | Compute the first and second derivative of a function and use them to determine the intervals where the function is increasing decreasing concave up concave down and to find its maxima minima inflection points and to sketch its graph. | Lecture Problem Solving | Written Exams Quizzes |
| 2.3 | Compute the indefinite and/or definite integral of elementary functions. | Lecture Problem Solving | Written Exams Quizzes |
| 3.0 | Values | | |

2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|------------------|-----------|--------------------------------------|
| 1 | Quizzes | continues | 10% |
| 2 | Midterm Exam | 6 | 30% |
| 3 | Final Exam | 12 | 60% |

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Academic advising and counseling of students is an important component of teaching; student academic advising is a mandatory requirement of College of Computers and Information Technology (CCIT). Appropriate student advising provides support needed for the student during times of difficulty. In addition, it helps the student to build a close relationship with his/her advisor and to provide student motivation and involvement with the institution.

In addition, since faculty are usually the first to recognize that a student is having difficulty, faculty members play a key role in developing solutions for the students or referring them to appropriate services. Faculty members also participate in the formal student-mentoring program.

Additional counseling is provided by course directors, who provide students with academic reinforcement and assistance and refer “at risk” students to the Vice Dean for Academic Affairs and the Vice Dean for female section.

F. Learning Resources and Facilities



1. Learning Resources

| | |
|---------------------------------------|---|
| Required Textbooks | Calculus; Early Transcendentals, James Stewart, Cengage Learning, ISBN: 0538497815, 2011. |
| Essential References Materials | NON |
| Electronic Materials | NON |
| Other Learning Materials | NON |

2. Facilities Required

| Item | Resources |
|--|--|
| Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) | <ul style="list-style-type: none"> • A Lecture room appropriate for maximum 25 students with a personal computer, a data show and a smart board. • A Lab room appropriate for maximum 15 students with a personal computer, a data show and a smart board. |
| Technology Resources (AV, data show, Smart Board, software, etc.) | <ul style="list-style-type: none"> • Lab materials and required software |
| Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | |

G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|--|----------------------|--|
| Effectiveness of Teaching | Students | Students surveys and Students course evaluation |
| Improvement of Teaching | Course Coordinator | deficiencies based on the student Evaluation, faculty input, course file, and program assessment |
| Verifying Standards of Student Achievement | Curriculum Committee | <ul style="list-style-type: none"> • Review CAF (Course assessment file) • Alumni surveys. Periodic exchange and remarking of tests or a sample of assignments with staff at another |

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)



H. Specification Approval Data

| | |
|---------------------|--|
| Council / Committee | IT Department Council/ Executive program committee |
| Reference No. | 11 |
| Date | 23/10/21443 |

Handwritten signature in blue ink, possibly reading "Dr. P. S.", enclosed in a hand-drawn oval.

قسم تقنية المعلومات
Information Technology
Department
TU
جامعة تائف
TAF UNIVERSITY

كلية الحاسب وتقنية المعلومات
College of Computer and
Information Technology
TU
جامعة تائف
TAF UNIVERSITY