Course Specifications

General Information

Course name	Calculus(2)
Course number	MATH1402
Faculty	
Department	
Course type	College Needs
Course level	1
Credit hours (theoretical)	3
Credit hours (practical)	1
Course Prerequisites	

Course Objectives

1 - study and recognize other important classes of functions as logarithmic functions, exponential functions and hyperbolic functions

2 - learn basic techniques of integration for functions with one variable

3 - be prepared to take more advanced courses in mathematics

4 - understand infinite series and their convergence and divergence criteria and know how they can be used in approximation techniques

5 - enable student to apply his knowledge to solve practical problems they encounter in phisical sciences and engineering

Intended Learning Outcomes

Knowledge and Understanding	* study and recognize other important classes of functions as logarithmic functions, exponential functions and hyperbolic functions
	* use integration by parts, trigonometric substitution, partial fraction to evaluate definite and indefinite integrals
	* define an improper integral and evaluate some classes of improper integrals by the concepts of limits, convergence and divergence
	* determine convergence or divergence of sequences and series
	* use Taylor and Maclaurin series to represent functions
	* use Taylor and Maclaurin series to integrate functions
Intellectual Skills	* develop and strengthen problem solving
	* understand concepts rather than mimic techniques
	* learn to think about problems mathematically and to solve problems independently
Professional Skills	* be able to state and explain basic calculus definitions and theorems
	* understand the relationship between the process and its corresponding inverse
	* understand the meaning and important applications of the concepts
	* have a clear understanding of the ideas of calculus as a foundation for subsequent courses in mathematics
General Skill	* hone the ability to do reality checks on calculations
	* become effective communicator and team player
	* learn to work together productively and learn to be cooperative
	* be able to communicate mathematics

Course Contents

1 - Logarithmic and Exponential Functions : invers functions- the natural logarithmic function - the natural exponential function - integration - general logarithmic and exponential functions

2 - Inverse Trigonometric and Hyperbolic Functions: inverse trigonometric functions- derivatives and integrals- hyperbolic functions - inverse hyperbolic functions

3 - Techniques of integration: integration by parts - trigonometric integrals - trigonometric substitutions - integrals of rational functions- integrals involving quadratic expressions - miscellaneous substitution

4 - Indeterminant forms and Improper Integrals: indeterminant forms and l Hopitals rule - integrals with infinite limits of integration - integrals with discontinous integrands

5 - Infinite Series: sequences - convergent or divergent series - positive term series tests- the ratio and root test- alternating series and absolute convergence- power series- power series representation of functions- Maclaurin and Taylor series- the binomial series

Teaching and Learning Methods

1 - lectures

2 - discussion

Students Assessment

Assessment Method	TIME	MARKS
first midterm exam	after 6 weeks of study	25%
second midterm exam	after 10 weeks of study	25%
final exam	at the end of the semester	50%

Books and References

Essential books	Calculus, fifth edition; Earl W. Swokowski; Pws-Kent Puplisher Company, 1991
Recommended books	Calculus with analytic geometry- Robert Ellis & Denny Guhick,1996
	1996, Calculus- Thomas Finny; Addison-Wiesely Puplishing Company,Inc
Other References (Periodical, web sites, ... etc.)	all calculus books

Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
inverse functions- the natural logarithmic function- the natural exponential function- integration- general exponential and logarithmic function	1-2	* study the inverse of the functions and recognize other important functions * integrate functions with certain kinds * apply the procedures of logarithmic differentiation accurately	introduce mind to the scientific method of analysis	*be able communicate mathematics * helpt to do reality chekes on calculations	* work in cooperative learning groups * use mathematics to understand the world around him
-Inverse trigonometric and hyperbolic functions inverse trigonometric functions- derivatives and integrals- hyperbolic functions- inverse hyperbolic functions	3-5	recognize, differentiate and integrate trigonometric and hyperbolic functions	* hone the ability of the student to do reality checks on calculations * provide students with an understanding of mathematical thought and knowledge	*be able to state and explain basic calculus defenitions and theorems	* be able to communicate mathematics * work in cooperative learning groups
integration by parts- trigonometric integrals- trigonometric substitutions- integral of rational functions- integral involving quadratic expressions- miscellaneous substitutions	6-8	study the detailed methods of integration to evaluate definite and indefinite integrals	* provide student with an understanding of mathematical thought and knowledge * introduce mind to scientific methods of analysis	understand the major problems of integral calculus	work in cooperative learning groups help to communicate mathematics
the indeterminant forms and improper integrals- integrals with infinite limits of integration- integrals with discontiuous integrands.	9-11	* invistigate limits with indeterminant forms * study improper integrals, their convergence and divergence	* be a broblem solver * introduce mind to the scientific methods of analysis	* utilize these topics in many mthematical and physical applications	* work together productively and learn cooperatively * demonstrate and understand the important applications of the concepts

Sequences- convergent or divergent series- positive term series and integral test- alternating series and absolute convergence- -power series- power series representation- Taylor series	12-15	* determine whether the sequence converges or diverges * use convergence tests to determine convergence of infinite series *to use Taylor and Maclaurin series to approximate functions	introduce mind to to the scientific methods of analysis	* allow students to consider problems that cannot be solved using finite or conventional methods * prepare student to understand other courses of mathematics	* be a problem solver * learn cooperatively and to work together productively