جامعة: المنصورة
كـــلية: العلـــوم
قـســـم: الرياضيات

		١ ـ بيانات المقرر
المستوى: الأول (بيولوجي)	أسم المقرر: **Differentiation & Integral Calculus, Algebra & Geometry**	الرمز الكودى : **Mathematics**
	عدد الوحدات الدراسية: 8 نظرى 4 تمارين 4 عملى 0	التخصص: علوم البيئة

The course aims to 1. **Provide a firm foundation in the concepts and techniques of the calculus.** 2. **Gain knowledge of limits, real numbers, standard functions, continuity, differentiation, integration of functions of one variable.** 3. **Apply mathematical techniques, tools, and formulas to solving problems in calculus, algebra and geometry.** 4. **Recognize and use various types of reasoning and methods of proof.**	٢ ـ هدف المقرر:

٣ـ المستهدف من التدريس المقرر:	

On completion of this course successful students will be able to: **a1- Identify the different methods of differentiation, Integration and their applications in biological field.** **a2- Define mathematical techniques to solving problems in calculus, algebra and geometry.** **a3- Explain the elementary functions, the basic rules of the differential and integral calculus for functions of one variable .** **a4- Illustrate the formulas of straight lines, parabola, ellipse and hyperbola** **a5- Explain the basic concepts of Pure Mathematics such as sets, complex numbers ; Partial fractions ; parabola, ellipse and hyperbola**	أـ المعلومات والمفاهيم:
On completion of this course successful students will be able to: **b1- Evaluate mathematical treatments of some fundamental topics in calculus, algebra and geometry** **b2- Prove theories of calculus, algebra and geometry** **b3- solve mathematical problems in calculus , algebra and geometry** **b4 - Analyze mathematical expressions in algebra and geometry.**	بـ المهارات الذهنية
By the end of the course students will have the ability to: **c1- Integrate different kinds of expressions in calculus.** **c2- Apply numerical techniques for solving simple differential equations** **c3- Relate mathematical concepts to life problems in calculus, algebra and geometry.**	جـ المهارات المهنية الخاصة بالمقرر:
On completing this course, students will be able to: **d1- Solve problems.** **d2- Work effectively both in a team and independently** **d3- Use information and communication technology effectively**	دـ المهارات العامة :
Differention	٤ ـ محتوى المقرر:

- ✓ Functions
- ✓ Limits and continuity.
- ✓ Differentiation: (Basic ideas; tangent to a curve; the product and quotient rule; the chain rule for differentiating $f(g(x))$; higher derivatives, implicit differentiation)
- ✓ Derivatives of trigonometric functions and their inverse
- ✓ Derivatives of the log function ln; the exponential function exp and ax
- ✓ Derivatives of hyperbolic functions and their inverse
- ✓ Applications of derivatives

Integration

- ✓ Integration
- ✓ Techniques of Integration: (Integration by substitution-Integration of trigonometric and hyperbolic functions - Integration of parts - Integration of rational functions by partial fractions- Integration of parameter dependent functions)
- ✓ Applications of Integration

Algebra

- ✓ sets
- ✓ Determinants – matrices
- ✓ mathematical induction
- ✓ Partial fractions
- ✓ complex numbers

Geometry

- ✓ Translation and Rotation of Axes,
- ✓ Pairs of Straight Lines
- ✓ Conic Sections.

4 - Teaching and Learning Methods **4.1 - Lectures (4H/W).** **4.2 - Tutorial (4H/w).**	اساليب التعليم والتعلم:
The same as normal students, only skeletal disabilities are allowed in the Faculty of Science.	أساليب التعليم والتعلم للطلاب ذوى القدرات المحدودة:
	تقويم الطلاب :

Student Assessment Methods			أـ الأساليب المستخدمة :
Written exam.	to assess	**a1,a2,a3,a4,a5, c1,c2,c3**	
Oral exam	to assess	**b1,b2,b3, d1,d2,d3**	

Assessment Schedule			ب ـ التوقيت :
Assessment 1	**Week #**	**14**	
Assessment 2	**Week #**	**14**	

Weighting of Assessments		ج ـ توزيع الدرجات :
Final-Term Examination	**90**	
Oral Examination	**10**	
Practical Examination	**0**	
Semester work	**0**	

Other types of assessment	0	
Total	100%	

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٨ـ قائمة الكتب الدراسية والمراجع :

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Course Notes: Differentiation & Integral Calculus, Algebra & Geometry authorized and issued by the department of mathematics	أـ مذكرات:
H Edwards, Elementary differential equations with boundary value problems, Pearson Prentice Hall, 2004. H. Anton, Elementary Linear Algebra, Wiley 1994.	بـ كتب ملزمة
6- J.B. Fraleigh & R.A. Beauregard, Linear Algebra, Addison-Wesley 1995 7- R.B.J.T. Allenby, Linear Algebra, Butterworth Heinemann, 1997	جـ كتب مقترحة :
1- http://en.wikipedia.org/wiki/Calculus 2- http://www.math.niu.edu/~beachy/aaol / 3- http://www.sosmath.com/calculus/calculus.html	دـ دوريات علمية أو نشرات..

المحتويات للمقرر	اسبوع الدراسة	المعارف الرئيسية	مهارات ذهنية	مهارات مهنية	مهارات عامة
Differention:					
Functions	١	a1	b1		d1
Limits and continuity.	١	a1	b1		d1, d2
Differentiation: (Basic ideas; tangent to a curve; the product and quotient rule; the chain rule for differentiating f(g(x)); higher derivatives, implicit differentiation)	٢	a1, a2, a3	b1, b2		d1, d2
Derivatives of trigonometric functions and their inverse	٢	a1,a2, a3	b2, b3		d1, d2
Derivatives of the log function ln; the exponential function exp and ax	٣	a1,a2, a3	b2, b3		d1, d2
Derivatives of hyperbolic functions and their inverse	٣	a1,a2, a3	b2, b3		d1, d2
Applications of derivatives	٤	a1, a2,a3	b2, b3	c1,c2,c3	d1, d2, d3
Integration					
Integration	٥	a1	b1		d1
Techniques of Integration: (Integration by substitution- Integration of trigonometric and hyperbolic functions - Integration of parts - Integration of rational functions by partial fractions- Integration of parameter dependent functions)	6-7	a1, a2, a3	b2, b3		d1, d2, d3
Applications of Integration	٧	a1, a2, a3	b2, b3	c1,c2,c3	d1, d2, d3
Algebra					
sets	٨	a1	b1, b2		d1, d2
Determinants – matrices	٨	a1, a5	b1, b2, b4		d1, d2, d3

mathematical induction	٩	a1, a5	b1, b2, b4		d1, d2
Partial fractions	٩	a1, a5	b1, b2, b4		d1, d2
complex numbers	١٠	a1, a5	b1, b2, b4		d1, d2, d3
Geometry					
Translation and Rotation of Axes,	١١	a1, a4	b1,		d1, d2
Pairs of Straight Lines	١١	a1, a4	b1, b2, b3, b4		d1, d2
Conic Sections	١٣-١٢	a1, a4	b1, b2, b3, b4	c2,c3	d1, d2, d3

أستاذ المقرر: أ.د. محمد السيد الشافعى   رئيس مجلس القسم العلمى : أ.د. أحمد حبيب محمد نجيب البسيونى