RSE INFORMATION

COUR

DEPARTMENT

DESCRIPTIVE TITLE

SEMESTER HOURS

NAME & NUMBER OF COURSE

CREDIT

RELATED COURSES:

COURSES FOR WHICH THIS IS A PREREQUISITE:

Physics PHY420 (Electro-magnetic theory)

EWHERE)

TEXTBOOKS, REFERENCES, MATERIALS (LIST READING RESOURCES ELS

COURSE OBJECTIVES, CONTENT, METHOD, EVALUATION:

[illegible] define tangent and normal to [illegible]

define and compute $\int_C f(x)\,ds$, $\iint_A f(x)\,dA$, $\iiint_V f(x)\,dV$

$C \subset \mathbb{R}^2$ $A \subset \mathbb{R}^3$

[illegible] expressions involving [illegible]

Review change of variables. Define [illegible], etc.

[illegible] define tangent plane and normal.

2. Represent surfaces parametrically

define and compute $\int_S f(\underset{\sim}{x})\,dA$.

3

Recognize application of scalar and vector fields in the study of temperature, pressure, heat and fluid flow, etc.. Define gradient and relate to tangent plane and physical ideas. Sketch equi-potentials and stream lines for gi[illegible] potential [illegible]

Define $\int F(x)\cdot ds$ and interpret as work or flow. Recognize the dependence on ℓ

4.

function concept and the notion of kinetic

Investigate entropy and the state

onservative field. State and

and potential energy. Define potential and co

cence of potential, invariance under

Review [illegible] standard results concerning [illegible]

[illegible] over [illegible] in [illegible]

5. Define $\int F(x)\cdot dn$ and $\iint F(x)\cdot dA$ and interpret as flows

5

e in a coordinate-free manner; derive the Cartesian formulae

6. Define divergenc

recognize the physical significance of divergence,

In $\mathbb{R}^2$ and $\mathbb{R}^3$ and

ces and sinks.

investigate sour

[illegible] in a coordinate-free manner; derive the Cartesian formulae in $\mathbb{R}^2$ and $\mathbb{R}^3$ and investigate vortices and [illegible] recognize the physical significance of curl

auss', Stokes' and Green's theorems.

8. State and prove elementary forms of Ga

sical ideas conveyed by these theorems. Use them to evaluate

Describe the physical [illegible] describe the phy

reas and volumes etc.

integrals for ar

9. Obtain polar-coordinate expressions for gradient, divergence and curl

10. Discuss situations described by the equations of Laplace and Poisson obtain Cartesian polar representations for the Laplacian.

11. Deduce and use common vector identities.

METHOD AND EVALUATION

The class meets four times a week for fourteen weeks.

expected that most questions will be resolved outside class demand, but it is
onsultation with the instructor. time through c

r Algebra) is one of the co-requisites for this course; vector MAT 232 (Linea
notation will be used freely and whenever appropriate in this course.

The final letter grade for the course will be based on

hree tests during the course of the semester - th
comprehensive, three hour final examination - a

to the student's advantage the scores on the three tests will be If it is
ignored in arriving at the course grade.

courses in mathematics a Since this course is pre-requisite to most further
satisfactory score must be obtained on the fi
than P is to be awarded for the course