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ROWAN COLLEGE
CURRICULUM COMMITTEE

PROPOSAL TITLE: Transfer Processes I-Heat 0906.302

UNDERGRADUATE GRADUATE 2.0 CREDIT HOURS

SPONSOR(S): C. Stewart Slater and School of Engineering Curriculum Committee

DEPARTMENT & TELEPHONE# Chemical Engineering, x4631

CHECK ONE: COURSE MINOR PROGRAM CONCENTRATION SPECIALIZATION
 ACHIEVEMENT CERTIFICATE CERTIFICATION PROGRAM MAJOR PROGRAM

STEP #1 (DEPARTMENT)	STEP #2 (RECEIPT)	STEP #3 (SCHOOL)
<p>APPROVED/DATE: _____</p> <p>NOT APPROVED/DATE: _____</p> <p style="text-align: center;"><u>N/A</u></p> <p>DEPT. CURRICULUM CHR. _____</p> <p>REVIEWED/DATE: _____</p> <p style="text-align: center;"><u>N/A</u></p> <p>DEPT. CHR. _____</p>	<p>SCC# <u>95-96-180</u></p> <p>DATE RECEIVED: <u>3-8-96</u></p> <p style="text-align: center;"><u>Ronald J. Goshon</u></p> <p>SENATE CURRICULUM CHR. _____</p>	<p>REVIEWED DATE: <u>2-14-96</u></p> <p><input checked="" type="checkbox"/> RECOMMEND TO APPROVE</p> <p><input type="checkbox"/> RECOMMEND NOT TO APPROVE</p> <p style="text-align: center;">FORWARD FOR OPEN HEARING</p> <p><input checked="" type="checkbox"/> WITHOUT RESERVATIONS</p> <p><input type="checkbox"/> WITH RESERVATIONS</p> <p>COMMENTS: _____</p> <p style="text-align: center;"><u>[Signature]</u></p> <p>SCHOOL COMMITTEE CHR. _____</p>

STEP #4 (ACADEMIC DEAN)	COMMENTS:
<p><input checked="" type="checkbox"/> RECOMMEND</p> <p><input type="checkbox"/> NOT RECOMMEND</p> <p><input type="checkbox"/> CONDITIONALLY RECOMMEND (SEE COMMENTS)</p> <p>DATE & SIGNATURE, DEAN OF SCHOOL _____</p>	<p style="text-align: center;"><u>[Signature]</u> <u>3/6/96</u></p>

STEP #5 (SENATE CURRICULUM COMMITTEE)	Note: This replaces Transfer Process
<p>DATE OF OPEN HEARING <u>9/23/96</u></p> <p>APPROVED BY SENATE CURRICULUM COMMITTEE (DATE) <u>9/23/96</u></p> <p>RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS: _____</p>	<p><u>[Signature]</u></p>

STEP #6 (SENATE)	
DATE PRESENTED TO SENATE <u>9/25/96</u>	<input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> NOT APPROVED
NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE) <u>9/30/96</u>	
SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE <u>Ronald J. Goshon 9/30/96</u>	

ROWAN COLLEGE
CURRICULUM COMMITTEE

ROPOSAL TITLE: Transfer Processes I - Heat 1906-302

UNDERGRADUATE GRADUATE 2.0 CREDIT HOURS

SPONSOR(S): D. Stewart Slater and School of Engineering Curriculum Committee

DEPARTMENT & TELEPHONE# Chemical Engineering, x4631

CHECK ONE: COURSE MINOR PROGRAM CONCENTRATION SPECIALIZATION
 ACHIEVEMENT CERTIFICATE CERTIFICATION PROGRAM MAJOR PROGRAM

STEP #1 (DEPARTMENT)	STEP #2 (RECEIPT)	STEP #3 (SCHOOL)
<p>APPROVED/DATE: _____</p> <p>NOT APPROVED/DATE: _____</p> <p style="text-align: center;"><u>N/A</u></p> <p>DEPT. CURRICULUM CHR. _____</p> <p>REVIEWED/DATE: _____</p> <p style="text-align: center;"><u>N/A</u></p> <p>DEPT. CHR. _____</p>	<p>SCC# <u>92-16-20</u></p> <p>DATE RECEIVED: _____</p> <p style="text-align: center;"><u>Ronald J. Gordon</u></p> <p>SENATE CURRICULUM CHR. _____</p>	<p>REVIEWED DATE: <u>2-14-96</u></p> <p><input checked="" type="checkbox"/> RECOMMEND TO APPROVE</p> <p><input type="checkbox"/> RECOMMEND NOT TO APPROVE</p> <p style="text-align: center;">FORWARD FOR OPEN HEARING</p> <p><input checked="" type="checkbox"/> WITHOUT RESERVATIONS</p> <p><input type="checkbox"/> WITH RESERVATIONS</p> <p>COMMENTS: _____</p> <p style="text-align: center;"><u>[Signature]</u></p> <p>SCHOOL COMMITTEE CHR. _____</p>

STEP #4 (ACADEMIC DEAN) COMMENTS:

RECOMMEND

NOT RECOMMEND

CONDITIONALLY RECOMMEND (SEE COMMENTS)

DATE & SIGNATURE, DEAN OF SCHOOL: [Signature] 3/6/96

STEP #5 (SENATE CURRICULUM COMMITTEE)

DATE OF OPEN HEARING: 9/23/96

APPROVED BY SENATE CURRICULUM COMMITTEE (DATE): 9/23/96

RETURNED TO SPONSOR(S) FOR THE FOLLOWING REASONS: _____

Notes: This replaces Transfer Process.

STEP #6 (SENATE)

DATE PRESENTED TO SENATE: 9/25/96 APPROVED NOT APPROVED

NOTIFICATION TO EXECUTIVE VICE PRESIDENT/PROVOST (DATE): 9/30/96

SENATE CURRICULUM COMMITTEE CHAIR SIGNATURE/DATE: [Signature] 9/30/96

STEP #7 (EXECUTIVE VICE PRESIDENT/PROVOST)

DATE RECEIVED _____

APPROVED: YES NO

IF NO, REASONS ARE AS FOLLOWS:

STUDENT CREDIT HOURS _____

FACULTY LOAD HOURS _____

EQUALIZED CREDIT HOURS _____

OFFICIAL COPY & APPROVAL SHEET FILED (DATE) _____

SIGNATURE, EXECUTIVE VICE PRESIDENT/PROVOST _____

REGISTRAR

DATE APPROVED COURSE DESCRIPTION RECEIVED 14 MAR 97

HEGIS TAXONOMY AND COURSE NUMBER ASSIGNED 09061302

DATE/SIGNATURE OF REGISTRAR B. Kelson

NOTIFICATION FORWARD:

___ SENATE CURRICULUM COMMITTEE CHAIRPERSON

___ DEPARTMENT CHAIRPERSON(S)

___ ACADEMIC DEAN(S)

___ REGISTRAR

___ SPONSOR(S)

*Course Proposal***1. Details:**

- a) Course Title:** Transfer Processes I - Heat
b) Sponsor: School of Engineering Curriculum Committee;
 Dr. C. Stewart Slater, Chemical Engineering
c) Credit Hours: 2 credit hours
d) Course Level: Junior (0906.301)
e) Curricular Effect: Requirement for ChE and ME, Elective for CE and EE
f) Prerequisites: Fluid Mechanics, Math for Engineering Analysis II
**g) Suggested Time/
 Scale of Implementation:** Spring 1999
 1 section each semester
h) Resources: Faculty will be hired and equipment obtained
 consistent with Engineering School multi-year plan.
 Library acquisitions will be necessary.

2. Rationale:

The proposed course is part of the Engineering Curriculum Proposal approved by the College Senate in December 1994. The course has been modified slightly from the previously approved version in the number of semester hours and topics covered. The proposed course is consistent with the establishment of the School of Engineering approved by the Board of Trustees in February 1995.

The proposed course is a Core Requirement for Chemical Engineering and Mechanical Engineering and a Core Elective for Civil/Environmental and Electrical Engineering. The course is also a Chemical Engineering Program Criteria requirement of the Education and Accreditation Committee (EAC) of the American Institute of Chemical Engineers (AIChE) for accreditation of the Chemical Engineering program by the Accreditation Board for Engineering and Technology (ABET).

The course lays the foundation in the transfer processes of heat transport and will serve several of the engineering disciplines. The course is vital to the Engineering School Core offerings and will provide students with an understanding of basic principles of heat transfer.

3. Essence of the Course:**a) Objectives:**

Upon completion of the course, students will be able to:

1. Understand the basic principles that govern transfer processes and the fundamentals of heat transport.

2. Apply the basic principles of heat transfer to design problems.
3. Understand the differences between the various modes of heat transfer.
4. Apply the principles of heat transfer to basic industrial processes.
5. Work in groups to solve open-ended design problems.

b) Topical Outline:

The topics to be covered are listed below. The instructor will supply the students with a syllabus during the first week of classes. The instructor will assess any technology advances in the subject matter prior to the course and make topic changes as deemed appropriate to maintain the level and currency of instruction.

Introduction to transfer processes

General transfer equations for momentum, heat, mass transport

Principles of steady state heat transfer

Conduction and thermal conductivity

Convective heat transfer coefficient

Conduction heat transfer

Conduction through walls/slabs, cylinders, spheres

Conduction through multi-layer/composite geometries

Overall heat transfer coefficient

Numerical methods in steady state conduction

Forced convection heat transfer

Heat transfer coefficient in pipes; laminar and turbulent flows

Heat transfer coeff.; flow outside flat plate, cylinders/tubes, spheres

Natural convection heat transfer

Natural convection from various geometries

Boiling and condensation

Nucleate and film boiling

Film condensation - vertical and horizontal surfaces

Heat exchangers

Double-pipe

Shell and tube

Cross-flow

Design parameters

Effectiveness

Overall heat transfer coefficients

Radiant heat transfer

Simple radiation from object to surroundings

View factors in radiation from various geometries

Special considerations in heat transfer

Agitated vessels, extended surfaces

Unsteady state heat transfer

Unsteady state conduction in various geometries -
semiinfinite solid, flat plate, cylinder

Numerical methods for unsteady state conduction analysis

c) Evaluation and Grading Procedure of Students:

Student grades will be based on examinations, homework and/or projects. A course syllabus with a stated method of arriving the final grade, e.g., number of exams, projects, homework, percentage of grade, will be distributed to students the first week of classes.

d) Course Evaluation:

The proposed course will be evaluated on the basis of student evaluations and curriculum review by appropriate faculty.

4. Results of Consultations:

The proposed course is part of the Engineering Curriculum Proposal approved by the Faculty Senate in December 1994. Consultations were submitted with original proposal as specified by the Curriculum Committee.

Catalog Description

Transfer Processes I - Heat (0906.301)

Prerequisites: Fluid Mechanics, Math for Engineering Analysis II

This course describes modes of heat transfer: conduction, convection (forced and natural) and radiation. It presents steady and unsteady state analysis of heat transfer, types of heat exchangers and heat exchanger design. Demonstrations and laboratories will be integrated throughout the course.