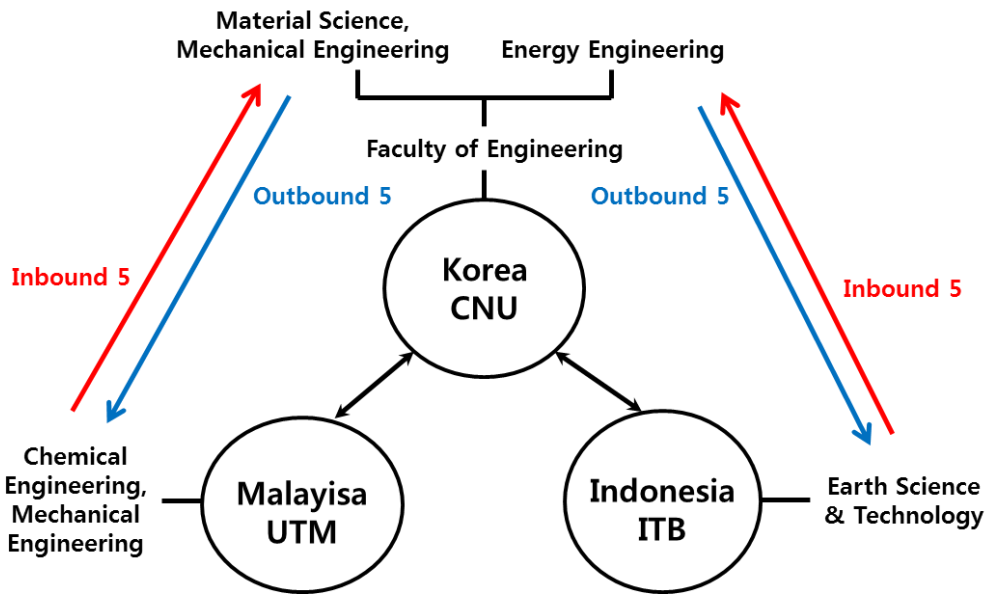
2017 AIMS Programme

Chonnam National University, Korea

▫ CNU AIMS Programme Overview

The AIMS Programme is designed to facilitate both in-depth academic training and invaluable experiences in Korea for university students, who have engineering major from UTM(University of Technology Malaysia), Malaysia and ITB(Institute of Technology Bandung), Indonesia. While participating in this program, students will complete courses related to their field of specialization, perform research projects with Korean graduate students, visit local industry leaders in engineering, undertake cultural experiences and more.



※ CNU AIMS Buddy Program

The buddy program is designed to ensure that every student feels comfortable in their new surroundings. With their CNU Korean buddies, students can engage in a life-long friendship, as well as learn about student life in Korea and venture around Gwangju. (One Korean buddy for each AIMS participant)

□ Contact Point

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□ Curriculum (Program Components)

1. **Classroom Instruction**: 3~5 courses (45 hours / 3 credit each)
2. **One-on-one Mentor Project**(Lab meeting): Once a week(15 weeks)
3. **Industry Site-visits**: Every Other Weekends (10 Sites / 30 hours)
4. **Korean Culture Experiences**: Every Other Saturday (7 Sites / 35 hours)

   – Seoul, Jeonju, Suncheon, etc.
5. **Korean Language Study**
   - Regular evening course(Language Education Center): Twice a week(38 hours / 15 weeks)
   - Coffee Hour: Once a week(15 weeks) with international students

□ Scholarship

1. **Tuition Fee:** Students should pay tuition fee to their home university. (CNU tuition fee will be waived)

2. **Dormitory & Meal plan Fee:** CNU will support the fee / 3 meals a day(7 days a week)

3. **Program Fee:** Lab mentoring, Visiting institute, Korean language classes, Korean culture trips (CNU will support the fee)

□ Applicants' qualification

- **5** students, who have 'Engineering of Material Science / Chemical / Mechanical / Energy' major, will be selected

□ Application Process

	Deadline	Remark
Online Application	30th, Oct. (Sun)	Email Submission (jeonbeyl@jnu.ac.kr)
Announcement (Acceptance)	Around Nov. 2016	Students, who get the permission from CNU, will begin to prepare the required documents for admission. Document form files will be sent by their email. ※ **While students prepare required documents, CNU will cooperate with Korean Embassy in Malaysia for issuing their visa**
Pick-up service	TBD	@ Incheon Airport (CNU official pick-up service)
Orientation	TBD	Orientation for CAMPUS-Asia AIMS exchange students
Program start	2nd March (Thu), 2017	2017 CAMPUS-Asia AIMS Program begins(English lecture starts)

□ Course Syllabus

Students can choose 3~5 courses regarding with the below course list.

Your Korean buddy will help you register classes on the CNU portal website (http://portal.jnu.ac.kr)

No	Course Title	Professor	Time	Period	E-Mail
1	Engineering Mathematics 1	Prof. Seunghun Jung	Mon 1, 2 Wed 1	9:00 ~11:00	shjung@jnu.ac.kr
2	Engineering Dynamics	Park, Gyuhae	Mon 7, 8 Wed 7	15:00 ~17:00	gpark@jnu.ac.kr
3	Mechanical Behavior of Materials	Hoonsung Cho	Tue 1 Thu 1	9:00 ~10:30	Cho.hoonsung@jnu.ac.kr
4	Sintering Theory and Phenomena	John Gerard Fisher	Tue 5 Thu 5	15:00 ~16:30	johnfisher@jnu.ac.kr
5	Future energy resource development engineering	Tam Tran	Tue 2 Thu 2	10:30 ~12:00	tamtran@jnu.ac.kr

※ The subject is to change depending on the CNU lecturers' availability.

SYLLABUS

Course Name	Engineering Mathematics1	Credit	3
Instructor	Prof. Seunghun Jung	Lecture Hours	Mon 1, 2 Wed 1
Department	School of Mechanical Eng.	Classroom	1A-306
Office	1A-408	Office hours	
Office telephone	(1665)	e-mail	shjung@jnu.ac.kr
TA		Course Grade	Undergraduate 1st year
Classification	Mandatory subject	Prerequisites	Calculus I

Course Overview	This course helps students to acquire knowledge on basic mathematics that is required to solve various engineering problems. During the first half, how to solve ordinary differential equations will be dealt with, and linear algebra including Laplace transform and vector matrix will be covered during the second half.
Lecture Objectives	To understand ordinary differential equations, linear algebra and vector matrices To improve the capability to solve engineering problems regarding to mathematics, natural science, engineering, by practicing its simplified standard problems To improve the capability to solve the problems creatively by practicing to model the engineering problems with the mathematical problems
Teaching Method	Writing on blackboard All lecture will be given in English
Grading	Quiz(20%), Midterm(30%), Final(30%), HW(10%), A/P(10%)
References	“Advanced Engineering Mathematics” (10th Edition), Kreyszig, John Wiley & Sons Inc. (2011)

[Relation with Program Outcome]

No.	Program Outcomes	Weight
1	An ability to apply knowledge of mathematics, basic science, engineering, and information technology	100
2	An ability to design and conduct experiments, as well as to analyze and interpret data	20
3	An ability to devise a system, component, or process to meet desired needs within realistic constraints	50
4	An ability to identify, formulate, and solve engineering problems	100
5	An ability to use techniques, skills, and engineering tools necessary for	30

[Weekly Schedule]

Week	Description	Remarks
1	Orientation Chapter 1. First-order Ordinary Differential Equations (ODEs)	
2	Chapter 1. First-order ODEs	
3	Chapter 2. Second-order ODEs	Homework #1
4	Chapter 3. High-order ODEs	Quiz #1
5	Chapter 4. Laplace Transform	
6	Chapter 4. Laplace Transform	
7	Chapter 5. Series solutions of ODEs. Special Functions	Homework #2
8	Midterm exam week	Midterm exam (10/19, In-class)
9	Chapter 5. Series solutions of ODEs. Special Functions	
10	Chapter 6. Linear Algebra: Matrices, Vectors, Determinants. Linear Systems	
11	Chapter 6. Linear Algebra: Matrices, Vectors, Determinants. Linear Systems	Homework #3
12	Chapter 7. Linear Algebra: Matrix Eigenvalue Problems	Quiz #2
13	Chapter 8. Systems of ODEs	
14	Chapter 9. Phase plane. Qualitative methods (stability)	Homework #4
15	Final exam week	Final exam (12/14, In-class)

SYLLABUS

Course	Engineering Dynamics	Credit	3
Instructor	Park, Gyuhae	Lecture	Mon 7, 8 Wed 7
Depart-	Mechanical Engineering	Classroom	Engineering 1A-303
Office	Engineering 1A-420	Counsel	W14:00-16:00
Office	062-530-1661	E-mail	gpark@jnu.ac.kr
TA		Course	Undergraduate 2nd
Classifica		Pre-	

Lecture objectives	The principal goal of this course is for students i) to learn the fundamental concepts of engineering dynamics and ii) to learn the mathematical formulations of dynamics problems and iii) to analyze the dynamics of particles and rigid bodies with applications. First, the kinematic properties, including displacement, velocity, acceleration, angular velocity and angular acceleration will be introduced. In addition, the concepts of the mass and inertia moment will be studied along with how to derive these properties. Students will then learn how to derive equation of motions of mechanical systems using free body diagrams. The concepts of work, energy, and momentum will also be studied and applied to analyze complex engineering systems.
Course Overview	Kinematics of particles Kinetics of particles Systems of particles Kinematics of rigid bodies Kinetics of rigid bodies
Teaching Methods	- Classroom lecture with Power point slides, a classroom board will be used when necessary.
Grading System	Midterm I & II (45%), Final (35%), Homework (10%), Students' class activities(5%)
Reference	"VECTOR MECHANICS for ENGINEERS" Ferdinand P. Beer, E. Russell Johnston, and Phillip J. Cornwell, McGraw-Hill, Tenth Edition

[Relation with Program Outcomes]

No.	Program Outcomes	Weight
1	an ability to apply knowledge of mathematics,	90
2	an ability to design and conduct experiments, as well as to	30
3	an ability to devise a system, component, or process to meet	70
4	an ability to identify, formulate, and solve engineering problems	40
5	an ability to use techniques, skills, and engineering tools necessary for	70
6	an ability to function in multi-disciplinary teams	
7	an ability to communicate effectively	
8	a recognition of the need for, and an ability to engage in life-long learning	
9	a broad understanding of the impact of engineering solutions in	
10	a knowledge of contemporary issues	
11	an understanding of professional and ethical responsibilities	
12	an understanding of other cultures and an ability to engage in	

[Weekly Schedule]

Wee	Description	Remarks
1	Kinematics of Particles: Rectilinear Motion	
2	Kinematics of Particles: Curvelinear Motion	
3	Kinetics of Particles: Newton’s Law	
4	Kinetics of Particles: Newton’s Law	
5	Kinetics of Particles: Energy and Momentum Method	
6	Kinetics of Particles: Energy and Momentum Method	
7	Midterm Exam	
8	Systems of Particles	
9	Kinematics of Rigid Bodies	
10	Kinematics of Rigid Bodies	
11	Plane Motion of Rigid Bodies: Forces and Accelerations	
12	Plane Motion of Rigid Bodies: Energy and Momentum Methods	
13	Plane Motion of Rigid Bodies: Energy and Momentum Methods	
14	Supplementary Lectures	
15	Final Exam	

SYLLABUS

Course Name	Mechanical Behavior of Materials	Credit	3
Instructor	Hoonsung Cho	Lecture Hours	Tue.1 Thu.1 (09:00~10:15)
Department	School of Materials Science and Engineering	Classroom	6-218
Office	6-310	Counsel Hours	
Office Telephone	530-1717	E-mail	cho.hoonsung@jnu.ac.kr
TA		Course Grade	Junior, Senior
Classifica -tion	Elective course	Pre-requisites	

Course Overview	The aim of this course is to provide traditional topics in the area, such as materials testing, yielding and plasticity, stress-based fatigue analysis, and creep. The relatively new methods of fracture mechanics and fatigue analysis are also considered in this course.
Lecture objectives	This course gives a full understanding of elastic and plastic deformation, creep, and fracture of materials including crystalline and amorphous metals, and ceramics, and focuses on the design and processing of materials from the atomic to the macroscale to achieve desired mechanical behavior.
Teaching Methods	Slides Presentation and group study.
Grading System	1. Attendance (10%) 2. Problem Sets (~5 Graded Homeworks or Quizes Over the Course of the Term) (30%) 3. Middle Exam.(30%) 4. Final Exam. The final exam is not cumulative.(30%)
References	1. Norman E. Dowling, Mechanical Behavior of Materials

[Relation with Program Outcomes]

No.	Program Outcomes	Weight
1	An ability to analyze data and to prove theories or hypotheses by experiments	100
2	An ability to identify and formulate challenges for engineering	100
3	An ability to use new technologies, reports, appropriate methods for solving challenges in engineering	100

[Weekly Schedule]

Week	Description	Remarks
1	Introduction	
2	Structure and Deformation in Materials	
3	A Survey of Engineering Materials	
4	Mechanical Testing: Tension Test and Other Basic Tests	
5	Stress-Strain Relationship and Behavior	
6	Review of Complex and Principal States of Stress and Strain	
7	Midterm Exam	
8	Yielding and Fracture under Combined Stresses	
9	Fracture of Cracked Members	
10	Fatigue of Materials	
11	Stress-Based Approach to Fatigue	
12	Fatigue Crack Growth	
13	Plastic Deformation Behavior and Models for Materials	
14	Time-Dependent Behavior: Creep and Damping	
15	Final Exam	

Course Name	Sintering Theory and Phenomena	**Credit**	3
Instructor	John G Fisher	**Class time**	Tue, Thur 5 (15:00-16:15)
Depart-ment	Materials Science & Engineering	**Classroom**	Lecture room 110
Office	Engineering Building 6 Room 315	**Counsel Hours**	Wednesday 11:00 am
Contact Number	062-530-1702	**E-mail**	johnfisher@jnu.ac.kr
TA	None	**Course Grade**	Undergraduate 3rd / 4th year
Classifica-tion	A type – 100% Eng. Elective Course	**Pre-requisites**	Physics, Chemistry, Materials Science
Course Overview	The fundamentals of sintering (densification and grain growth) will be explained. The basic principles of microstructre development during sintering will be given. The course can be divided into 6 parts. In part 1, the basics of sintering science will be discussed. In part 2, solid state sintering will be described. In part 3, grain growth in the solid state will be taught. In part 4, microstructure development will be covered. Part 5 will cover the sintering of ionic compounds. Finally, part 6 wiil deal with liquid phase sintering.		
Lecture objectives	To teach the theory and phenomena of sintering and grain growth in ceramics		
Teaching Methods	Powerpoint lectures		
Grading	Attendance, mid-term exam, end of term exam.		

System	
References	Sintering: Densification, Grain Growth & Microstructure, Suk-Joong L. Kang, (Elsevier), materials prepared by the lecturer.

[Relation with Program Outcomes]

No.	Program Outcomes	Weight	CEATool
1	An ability to apply knowledge of mathematics, basic science, engineering and information technology to solve problems in engineering.	105	
4	An ability to utilize the latest information, research results and appropriate tools to solve problems in engineering.	105	
5	An ability to design systems, components and processes within realistic constraints.	90	

[Weekly Schedule]

Week	Description	Remarks
1	Introduction, sintering processes, thermodynamics of the interface	
2	polycrystalline microstructures, initial stage sintering	
3	intermediate & final stage sintering	
4	Normal grain growth & second phase particles	
5	Grain boundary segregation & grain boundary migration	
6	Interface migration under chemical inequilibrium, abnormal grain growth	
7	Midterm Exam	
8	Grain boundary energy and sintering	
9	Grain growth and densification in porous materials	
10	Sintering additives and defect chemistry	
11	Densification and grain growth in ionic compounds	
12	Basis of liquid phase sintering	
13	Grain shape and grain growth in a liquid matrix	
14	Densification models & theories	
15	Final Exam	

SYLLABUS

Course Name	Economic resource	**Credit**	3
Instructor	Tam Tran	**Class time**	TUE 2, THU 2
Depart-ment	Department of Energy & Resources Engineering	**Classroom**	College of Engineering 3B-213
Office	College of Engineering 3A-313	**Counsel Hours**	any time
Contact Number	062) 530-0462	**E-mail**	tamtran@jnu.ac.kr
TA		**Course Grade**	third year student
Classifica-tion	an required course	**Pre-requisites**	
Course Overview	The course deals with aspects of cost accounting for resource project evaluation, including basic principles of project cost estimation (capex and opex), economic evaluation and funding of resource development projects.		
Lecture objectives	To train students on basic aspects of economics and cost accounting, applicable for resource project economic evaluation		
Teaching Methods	Lectures and case studies are presented in class. Individual project on cost evaluation and economic analysis of a resource development is conducted.		

Grading System	Mid semester test: 40%, Project: 20%, Final exam: 40%. Class attendance is recorded
References	Textbook published by CNU: Process Engineering Economics, Tran and Kim

[Relation with Program Outcomes]

No.	Program Outcomes	Weight	CEA Tool
1	an ability to apply knowledge of mathematics, basic science, engineering, and information technology	30	
2	an ability to design and conduct experiments, as well as to analyze and interpret data	60	
3	an ability to devise a system, component, or process to meet desired needs within realistic constraints	30	
4	an ability to identify, formulate, and solve engineering problems	60	
5	an ability to use techniques, skills, and engineering tools necessary for engineering practice	60	
8	Recognizing the needs for self-development and the ability to actively participate in future development with gained knowledgement	60	

[Weekly Schedule]

Week	Description	Remarks
1	Introduction: Economic evaluation concepts in mineral resource development	
2	Basic Cost accounting concepts: interest rate, time value of money, net present value, etc.	
3	Depreciation	
4	Taxation related to resource development	
5	Discount Cashflow analysis for resource project evaluation	
6	Calculations of net present value, internal rate of return	
7	Midterm Exam	
8	Spreadsheet training for plant design and cost estimation	
9	Computer lab training – DCF analysis	
10	Cost estimation of capital expenditures	
11	Cost estimation of operating expenditures	
12	Uncertainty and risk analysis for project evaluation	
13	Resource project financing	
14	Case studies on resource project evaluation and course review	
15	Final Exam	