



ChE 143

Chemical Engineering Research 1

Course Description: Design of experiments. Conceptualization and proposal writing for a chemical engineering research project. Technical paper writing and presentation.

Course Prerequisites: ChE 124 and ChE 135

Course Credit: 2.0 units (1 h lecture, 3 h laboratory)

Program Educational Objectives (BS Chemical Engineering)

The program aims to educate students such that three to five years from graduation, they:

1. take leadership roles in their respective fields and/or effectively work in or manage a team;
2. are equipped with the extensive knowledge and relevant skills necessary to succeed in their chosen careers and to become responsive citizens;
3. are able to demonstrate strong research & innovative capability as they recognize and address opportunities and challenges in their respective spheres of influence;
4. have shown strong commitment to the ethical practice of their profession; to health, safety and environment; and service to society.

Course Outcomes

At the end of the course, the student should be able to:

1. Write a literature review paper;
2. Design experiments;
3. Analyze experimental data using suitable statistical methods;
4. Write and present a research project proposal; and
5. Demonstrate ability to work in a team.

Student Outcomes Satisfied by Course Outcomes

- [b] Ability to design and conduct experiments, as well as to analyze and interpret data
- [e] Ability to identify, formulate, and solve engineering problems
- [g] Ability to communicate effectively
- [i] Recognition of the need for, and an ability to, engage in life-long learning
- [j] Knowledge of contemporary issues
- [l] Knowledge and understanding of engineering and management principles as a member and leader in a team, to manage projects and in multidisciplinary environments

Course Content

Lecture Activities

Meeting	Topic
1	Syllabus, Department HSE reminders, Introduction to R&D and its role in value upgrading, Intellectual Property & Value Creation; Literature Review, Patent Search, Knowledge Map and Writing the Research Proposal
2	Introductory Statistics
3	Exploratory Data Analysis
4	Hypothesis Testing

Meeting	Topic
5	Hypothesis Testing
6	Introduction to DOE
7	Factorial Design

Laboratory Class Activities (Research Adviser/Research Laboratory Head)

- Orientation
 - a. Research laboratory policies and management system of research laboratory facility (Research Laboratory Head);
 - b. General schedule of laboratory activities (general milestones and adviser-specified deliverables);
 - c. Effective teamwork and assignment of key responsibilities and tasks among members including facility management tasks (Research Adviser & Research Laboratory Head).
- Consultations and presentation of specific deliverables required by research adviser
 - a. General milestones:
 - Background and Significance (Literature Review), identification of knowledge gaps
 - General and Specific Objectives, scope
 - Materials and Methods, Design of Experiment
 - Gantt Chart of Activities with distribution of key responsibilities and tasks among members (research implementation)
 - Line Item Budget (if applicable)
 - b. Adviser-specified deliverables
- Class Presentation of Research Proposals

General Content of Research Proposal

- Duly signed transmittal letter addressed to the adviser
- Title Page with complete information including affiliation
- Introduction (Background, Knowledge gaps, Problem Statement, General and Specific Objectives, Significance of the Study, Scope and Limitations)
- Literature Review
- Materials and Methods (Resources needed – software, hardware, reagents, supplies, 3rd party services, materials and fabrication services; Design of Experiment, proposed and standard procedures or protocols including HSE practices)
- Expected outputs
- Schedule of activities (Gantt Chart)
- References
- Line-item budget
- Appendices (Detailed procedures)

Course Assessment

Lecture (50%)

Talks	5%
Seatworks and Assignments	20%
Long Examinations	75%

Laboratory (50%)

Research Proposal/Delivery of weekly consultation requirements/oral presentation of research proposal in class/Teamwork skills

Presentation and full attendance in the Department Research Proposal Colloquium on the last day of final examinations for the term

Grading System

1.00	1.25	1.50	1.75	2.00	2.25	2.5	2.75	3.00	5.00
[92,100]	[88,92)	[84,88)	[80,84)	[76,80)	[72,76)	[68,72)	[64,68)	[60,64)	[0,60)

List of Instructors

Dr. Rizalinda de Leon

Dr. Bryan Pajarito

Dr. Maria Lourdes Dalida

Dr. Terence Tumolva

Dr. Jose Muñoz

Dr. Analiza Rollon

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Prof. Kristian July Yap

Prof. Jonas Karl Christopher Agutaya

Prof. Jhud Mikhail Aberilla

Prof. Karl Ezra Pilario

Prof. Charlimagne Montealegre

Engr. Louie Arelvi Villanueva

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