

COURSE SYLLABUS

Course Name: Research Methodology in Biomedical Engineering

Course Code: BM600

1. General information

Course designation	<i>The course covers basic principles for conducting research, different approaches to do research individually or in group, methods for selecting experimental tools, methods for problem solving and collection data, and experimental design. Students will also acquire skills for the presentations in public and editing of research proposals and publications and reviewing manuscripts.</i>	
Semester(s) in which the course is taught	1	
Person responsible for the course	Dr. Huynh Chan Khon	
Language	English	
Relation to curriculum	Compulsory	
Teaching methods	Lecture, homework, class presentation	
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 90 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 Private study including examination preparation, specified in hours: 45	
Credit points	4	
Required and recommended prerequisites for joining the course	None	
Course objectives	<ul style="list-style-type: none"> • Theoretical knowledge of different aspects such as research methodology, methods to conduct an experiment, collect data, analyze the results, and write scientific publications. • Practical skills such as planning projects, designing experiments, using existing statistics software to process data, writing, and giving critics on proposals and manuscripts. • Experiences on individual/team learning and mentoring process. 	
Course learning outcomes	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO 1: Proficiency in core Biomedical Engineering principles CLO 2: Advance knowledge in research methodology

		CLO 6: Basic knowledge in Bioethics in scientific research
	Skill	CLO 3: Capability in conducting and mentoring research in BME CLO 4: Proficiency in communication and pedagogical skills in inter and multidisciplinary environment
	Attitude	CLO 5: Capability of appreciation and critics of research works
Content	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>	
	Weight: lecture session (3 hours)	
	Teaching levels: I (Introduce); T (Teach); U (Utilize)	
	Topic	Weight Level
	INTRODUCTION <ul style="list-style-type: none"> • Definitions of research • Characteristics of research • Objectives of research • Types of research • Quantitative and Qualitative Methods 	2 I, T, U
	CURRICULUM VITAE <ul style="list-style-type: none"> • What is the purpose of a CV? • Preparing Your Curriculum Vitae • Polishing your CV & sample CV • Covering letters 	2 I, T, U
	REVIEW PAPER <ul style="list-style-type: none"> • How to Read a Scientific Article? • Distinguish main points • Draw inferences • Summary 	2 I, T, U
CONCEPTUALISING A RESEARCH DESIGN <ul style="list-style-type: none"> • Selection of a research topic • Definition of a research problem • Literature survey and reference collection (How to use ENDNOTE 7 software) • Assessment of current status of the topic chosen • Formulation of hypotheses • Research design • Actual investigation • Data preparation • Data analysis • Data collection • Interpretation of result • Report 	3 I, T, U	
HOW TO WRITE A JOURNAL ARTICLE <ul style="list-style-type: none"> • How to Prepare the Title • How to List the Authors and Addresses • How to Prepare the Abstract 	2 I, T, U	

	<ul style="list-style-type: none"> • How to Write the Introduction • How to Write the Materials and Methods Section • How to Write the Results • How to Write the Discussion 		
	<p>HOW TO WRITE A RESEARCH PROPOSAL</p> <ul style="list-style-type: none"> • Golden Rules • Title of Research Project • Referees • Co-applicants • Budget • All other Operating Grants • Details of Research Proposal • Summary 	2	I, T, U
	<p>TYPICAL MISTAKES</p> <ul style="list-style-type: none"> • Comparisons • Definite / indefinite article • Infinitive vs Gerund • Negations • Passive vs Active • Pronouns • Vocabulary 	1	I, T, U
Examination forms	Research proposal writing, Homework.		
Study and examination requirements	<p>Attendance: A minimum attendance of 80 percent is compulsory for the class sessions. Students will be assessed on the basis of their class participation. Questions and comments are strongly encouraged.</p> <p>Assignments/Examination: Students must have more than 50/100 points overall to pass this course.</p>		
Reading list	<p>[1] Vo Van Toi, Lecture notes of Research Methodology in BME, 2012. [2] Day, R.A., How to write and publish a scientific paper. 4th edition, Cambridge University Press, USA, 1995. [3] Vo Van Toi, Hand-outs, 2012 [4] Gorn, J.L., Style guide for writers of term papers, Master's thesis and doctoral dissertations. Monarch Press, USA, 1973.</p>		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-6) and ASIIN Intended Learning Outcomes (ILO) (1-6) is shown in the following table:

	ILOs																			
	ILO.1		ILO.2			ILO.3			ILO.4				ILO.5				ILO.6			
CLO	1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4.1	4.2	4.3	4.4	5.1	5.2	5.3	5.4	6.1	6.2	6.3
1.1	X,5				X,5	X,5				X,5										
1.2							X,5	X,5	X,4	X,5		X,5		X,5		X,5				
3.1																		X,5	X,5	X,4,5

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
1-2	Introduction	1, 4		Lecture, Discussion	
3-4	Curriculum vitae	4	HW1	Lecture, HW	
5-6	Review paper	5,6		Lecture, Discussion	
7-8-9	Conceptualising a research design	2, 3, 6	HW2	Lecture, HW	
10-11	How to write a journal article	1, 5	HW3	Lecture, HW	
11-12	How to write a research proposal	3,5,6	Design of research Research proposal	Lecture, Discussion	
13	Typical mistakes	2			
14	Final Presentation	1,2,3,4,5,6	Presentation of final report	Presentation	

4. Assessment plan

Assessment Type	CLO1	CLO2	CLO3	CLO4	CLO5	CLO6
Homework exercises (30%)	HW3 50%Pass	HW2, 50%Pass	HW2, 50%Pass	HW1, 50%Pass	HW3 50%Pass	HW2, 50%Pass
Design of research (20%)	50%Pass		50%Pass		50%Pass	
Research proposal (20%)	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass
Presentation of final report (30%)	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

1. Grading checklist for Written Research Proposal and Presentation

Student: HW/Assignment: Date: Evaluator:						
Criteria	Excellent (18–20)	Good (15–17)	Fair (12–14)	Poor (0–11)	Score	Comments
Literature Review	<ul style="list-style-type: none"> - Comprehensive coverage and in-depth analysis clearly pointed out specific knowledge gaps to be addressed. - Displays a deep understanding and awareness of the latest developments, research findings, and emerging trends in biomedical engineering. Integrates this knowledge effectively into the research proposal. 	<ul style="list-style-type: none"> - Good coverage and analysis that may lack clear identification of knowledge gaps. - Shows good awareness of recent developments and research findings, with minor gaps or less integration into the proposal. 	<ul style="list-style-type: none"> - Limited review with outdated or irrelevant sources. - Limited awareness or application of recent developments and trends; may lack depth or currency in understanding. 	<ul style="list-style-type: none"> - Inadequate understanding of existing research or missing literature review. - A lack of awareness or consideration of the latest developments and trends in Biomedical Engineering. 		

<p>Research Problem and Significance</p>	<ul style="list-style-type: none"> - A crucial problem highly related to healthcare, outlining its significant impact, with persuasive justification for investigation. - Abstracts and formulates complex problems arising from new or emerging areas within biomedical engineering with in-depth analysis of the problem's context and consequences. Demonstrates the ability to tackle intricate issues effectively. 	<ul style="list-style-type: none"> - A problem related to healthcare, with clear justification for research. - Formulates complex problems with good clarity, but may lack detailed analysis of its significance. 	<ul style="list-style-type: none"> - Addresses a problem related to healthcare, but lacks complexity, clarity or persuasive justification for investigation. 	<ul style="list-style-type: none"> - A problem poorly defined or irrelevant to healthcare. - Struggles to abstract or formulate complex problems effectively. 		
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<p>Research Objectives and Methodology</p>	<ul style="list-style-type: none"> - Clear, particular, and relevant objectives. - Detailed, well-justified methodology that clearly described population, data collection methods, sample size justification, experiments, ethical considerations, and data analysis plan - Perfect alignment with the research question. 	<ul style="list-style-type: none"> - Clear objectives with minor ambiguities. - Adequate methodology with minor gaps that may lack detail or justification for specific methodological choices. - Fair alignment with the research question. 	<ul style="list-style-type: none"> - General objectives but with a lack of clarity. - Basic methodology with a considerable lack of detailed description. 	<ul style="list-style-type: none"> - Unclear or irrelevant objectives. - Inadequate or poorly justified methodology 		
<p>Clarity and Organisation</p>	<ul style="list-style-type: none"> - An excellent writing organisation with conciseness and free of grammatical errors. - Effective connection with the research question, methods, and significance in a clear, engaging, and professional manner. 	<ul style="list-style-type: none"> - A good writing organisation with minor grammatical errors or some lengthiness. - Fairly effective connection with the research question and methods, but may lack clarity or engagement. 	<ul style="list-style-type: none"> - A lack of organisation or clarity, with some grammatical errors. - Ineffective connection with the research question or methods. 	<ul style="list-style-type: none"> - A poor writing organisation with ambiguity and many grammatical errors. - Difficulty in understanding the research question, methods, or significance. 		

Presentation	<ul style="list-style-type: none"> - Slides are clear, well organised, and effectively support the presentation. - Demonstrates strong presentation skills, engages the audience - Handles Q&A confidently and professionally. 	<ul style="list-style-type: none"> - Slides are reasonably clear and well organised. - Presentation skills are generally good but need improvement. - Handles Q&A effectively. 	<ul style="list-style-type: none"> - Some issues with slide clarity or organisation - Presentation skills lack consistency or confidence during Q&A. 	<ul style="list-style-type: none"> - Slides lack clarity or effective organisation. - Struggles with presentation skills and faces challenges during Q&A. 		
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2. Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW

Score	Description
10	Demonstrates complete understanding of the problem. All requirements of the task are included in response.
8	Demonstrates considerable understanding of the problem. All requirements of the task are included.
6	Demonstrates partial understanding of the problem. Most requirements of the task are included.
4	Demonstrates little understanding of the problem. Many requirements of the task are missing.
2	Demonstrates no understanding of the problem.
0	No response/task not attempted.

Course Name: Progress in Biomedical Engineering

Course Code: BM601

1. General information

Course designation	<i>This course consists of two main parts: fundamental engineering technologies and methodologies, and their clinical applications. Bioethics will also be presented. Besides, a semester-long group project will be assigned. The project requires students to investigate new technologies and conceive, design and build a working device related to the Biomedical Engineering field.</i>
Semester(s) in which the course is taught	1
Person responsible for the course	Prof. Vo Van Toi

Language	English	
Relation to curriculum	Compulsory	
Teaching methods	Lecture, homework assignment, class presentation	
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 90 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 Private study including examination preparation, specified in hours: 45	
Credit points	4	
Required and recommended prerequisites for joining the course	None	
Course objectives	<p>The goal of the course is to offer a broad view of typical biomedical engineering aspects. Specific objectives consist of:</p> <ul style="list-style-type: none"> • Introducing research techniques and methods in biomedical engineering to help understand the principle of operation and to solve problems related to humans.. • Giving students opportunities to relate other fields to biomedical engineering. 	
Course learning outcomes	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO 1: Proficiency in core Biomedical Engineering principles
	Skill	CLO 3: Capability in conducting and mentoring research in BME CLO 4: Proficiency in communication and pedagogical skills in inter and multidisciplinary environment

1.2							X,5	X,5			X, 4.5			X, 5		X, 5				
3.1																				X,5
3.2											X, 5					X, 4.5	X, 5		X,5	

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities
1	Introduction to Biomedical Engineering	1	HW1	Lecture, Discussion, HW
2	Microfluidic devices: From laboratory to market	4	HW2	Lecture, HW
3	A glimpse of the soft piezoelectric sensors	1	Qz1	Lecture, Inclass-Quiz
4	Mechatronic and Mechanic in Biomedical Engineering	4	HW3	Lecture, HW
5	Neuro-Engineering	1, 3	HW4	Lecture, HW
6	Stem Cell Technology	1, 3	HW5	Lecture, HW
7	Nanotechnology for Biomedical application	1, 4	Qz2, HW6	Lecture, Group work, HW
8	Pharmaceutical Engineering	1	HW7	Lecture, HW
9	Biomaterials and Their Applications in Medicine	1,4	HW8	Lecture, HW
10	Introduction to Lab on a chip	1	HW9	Lecture, HW

4. Assessment plan

Assessment Type	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6
In-class exercises/quizzes (10%)	Qz1, Qz2 60%Pass			Qz2 60%Pass		
Homework exercises (50%)	HW1, HW4, HW5, HW6, HW7, HW8, HW9, 50%Pass		HW4, HW5, HW8, 50%Pass	HW2, HW3, HW6, 50%Pass		

Final report and Presentation (40%)	50%Pass		50%Pass	50%Pass		
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Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

1. Grading checklist

Student: HW/Assignment:						
Date: Evaluator:						
Criteria	Excellent (90–100)	Good (75–89)	Fair (60–74)	Weak (0<60)	Score	Comments
Understanding the progression and development of technologies in biomedical engineering	Correctly describe and fully understand the development of main technologies biomedical engineering with appropriate discussion, explanation or illustration	Correctly describe and fully understand the development of main technologies in biomedical engineering, but lack of appropriate discussion, explanation or illustration	Partly describe and partly understand the development of main technologies biomedical engineering	Do not seem to understand the development of main technologies biomedical engineering		
Ability to identify, formulate problems in biomedical engineering	Clearly identify and deeply describe main problems in biomedical engineering	Partly identify and well describe main problems in biomedical engineering	Slightly identify and partly describe main problems in biomedical engineering	Barely identify and describe main problems in biomedical engineering		

Gain new knowledge and propose new solutions to overcome challenges in biomedical engineering	Well understand the challenges in medicine and propose excellent solutions with scientific and logic discussions in biomedical engineering	Partly understand the challenges in medicine and propose good solutions with scientific and logic discussions in biomedical engineering	Partly understand the challenges in medicine and propose solutions without scientific and logic discussions in biomedical engineering	Do not seem to understand understand the challenges in medicine and can not propose solutions in biomedical engineering		
Report writing	The writing report has clear, logical and understandable structures. no spelling and grammar errors, and uses the correct scientific words	The writing report has clear, but not logical and understandable structures. A few spelling and grammar errors, and few mistake in use scientific words	The writing report has a structure, but is not clear. Some spelling and grammar errors, and does not use the correct scientific words	The writing report has no structure at all. Many spelling and grammar errors		

2. Holistic rubric for evaluating the entire document, e.g., exercises/quizzes/HW

Score	Description
10	Demonstrates complete understanding of the problem. All requirements of task are included in response
8	Demonstrates considerable understanding of the problem. All requirements of the task are included.
6	Demonstrates partial understanding of the problem. Most requirements of the task are included.
4	Demonstrates little understanding of the problem. Many requirements of the task are missing.
2	Demonstrates no understanding of the problem.
0	No response/task not attempted

Note: this rubric is also used to evaluate questions in an exam.

Course Name: Thesis

Course Code: BM651

1. General information

Course designation	<p><i>At the beginning of the 2nd semester, the candidate is required to submit and defend in front of the Thesis Committee his/her proposal. The component of the Committee and the defense process follow the University rules. By the end of the 2nd semester the candidate submits to the Committee a progress report.</i></p> <p><i>During the 3rd semester, the candidate is required to attend the Department seminars, present his/her work in-progress and answer to the critics. By the end of the semester, the candidate will defend his/her thesis in front of the Committee. The candidate can prolong the completion of his/her thesis within the permitted time frame allowed by the University rules. In such a case, a written request must be submitted to the Department.</i></p>					
Semester(s) in which the course is taught	2					
Person responsible for the course						
Language	English					
Relation to curriculum	Compulsory					
Teaching methods						
Workload (incl. contact hours, self-study hours)						
Credit points	53					
Required and recommended prerequisites for joining the course	None					
Course objectives	<p>The goal of the thesis is to give the opportunity to the candidate to prove that he/she has the capability to solve a scientific/engineering issue in a systematic way and in-depth. The investigation will help to advance knowledge of human biological processes or to develop a new medical device. The results must be publishable either in the form of an article in a peer-reviewed journal or a patent of invention.</p>					
Course learning outcomes	<p>Upon the successful completion of this course students will be able to:</p> <table border="1"> <thead> <tr> <th>Competency level</th> <th>Course learning outcome (CLO)</th> </tr> </thead> <tbody> <tr> <td>Knowledge</td> <td>CLO 1: Proficiency in core Biomedical Engineering principles CLO 2: Advance knowledge in research methodology</td> </tr> </tbody> </table>		Competency level	Course learning outcome (CLO)	Knowledge	CLO 1: Proficiency in core Biomedical Engineering principles CLO 2: Advance knowledge in research methodology
Competency level	Course learning outcome (CLO)					
Knowledge	CLO 1: Proficiency in core Biomedical Engineering principles CLO 2: Advance knowledge in research methodology					

		CLO 6: Basic knowledge in Bioethics in scientific research
	Skill	CLO 3: Capability in conducting and mentoring research in BME CLO 4: Proficiency in communication and pedagogical skills in inter and multidisciplinary environment
	Attitude	CLO 5: Capability of appreciation and critics of research works
Content	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>	
Examination forms	Report, presentation	
Study and examination requirements		
Reading list		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-6) and ASIIN Intended Learning Outcomes (ILO) (1-6) is shown in the following table:

	ILOs																			
	ILO.1		ILO.2			ILO.3			ILO.4				ILO.5				ILO.6			
CLO	1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4.1	4.2	4.3	4.4	5.1	5.2	5.3	5.4	6.1	6.2	6.3
1.1	X,5	X,5		X,5	X,5	X,5				X,5	X,5		X,5							
1.2								X,5		X,5	X,5	X,5					X,5			
2.1							X,5	X,5		X,5							X,5			
2.2			X,5	X,5			X,5	X,5							X,5		X,5			
3.1																		X,5		X,5
3.2				X,5						X,5		X,5							X,5	X,5
4										X,5		X,5		X,5	X,5				X,5	X,5

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
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	Research proposal defense	1,2,3,5			
	Thesis Defense	1,2,3,4,5,6	Thesis report, Thesis Defense		

4. Assessment plan

Assessment Type	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6
Thesis report and Thesis Defense	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

1. Master thesis evaluation form for academic advisor

<p>1. Student's Information:</p> <p>Name: _____ ID: _____</p> <p>Advisor's name: _____</p> <p>Thesis: _____</p> <p>2. Comments of advisor:</p> <p>a) Does student demonstrate a well understanding of the research problem through comprehensive exploration of existing knowledge in the literature and realization of the knowledge gap(s) to be addressed in the thesis?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>b) Does student clearly formulate the research problem and identify realistic constraints?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>c) Does student use appropriate methods, tools and instrumentation to solve the research problem?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>d) Does the result meet or exceed the research objectives?</p> <p>.....</p> <p>.....</p> <p>e) How does student conduct evaluation of the result's validity and reliability or perform the designed system, component, or process?</p>

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 f) How does student recognize the significance of the problem solved in the research, including positive and negative impacts (if any), and project the applicability of the solution?

 g) Does student have a clear and well-structured written report in the correct format?

 h) Recommendations about student's Attitude.

Date:
Signature

2. Master thesis comment form for reviewer

Student Name:
 Student Number: Intake:
 Specialization:
 Title of Paper:
 Date:
 Supervisor (Name):
 Reviewer (Name):

1. Content of the Thesis

2. Significance of the Thesis

3. Strengths of the Thesis

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4. Weaknesses of the Thesis

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5. Evaluator's Proposal: Qualified for Defending or Unqualified for Defending?

6. Challenging questions (please raise 2 questions):

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7. General Evaluation: _____ Grade: * _____

(* Hints for your grading)

	Maximum score	Score
CONTENT	100	
Formulation research question (problem statement, research question)	15	
English writing and Grammar	10	
Relevance of approach (Availability of information and data, treatment of data, reliability of data)	20	
Scope of analysis (Application of concepts, structure and consistency of argument/logic, problem solution)	30	
Strength of conclusions and recommendations (Generalizability, internal coherence, awareness of limitations)	10	
Form (Style, structure, abstract, bibliography and references)	15	

Date:

Signature

3. Master thesis evaluation form for member of master thesis grading committee

Student's name: ID:

Thesis title:

Supervisor (Name):

No.	Criteria	Maximum score	Score
1	Usefulness and applicability of the work	20	
2	Research methodology	20	
3	Oral presentation	20	
4	Defense	20	
5	Thesis report	20	
Total		100	

Questions/Comments

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Name of Examiner

Date of Signed

COURSE SYLLABUS

Course Name: Thesis of Research-based program 1

Course Code:

1. General information

Course designation	<p><i>At the beginning of the 2nd semester, the candidate is required to submit and defend in front of the Thesis Committee his/her proposal. The components of the Committee and the defense process follow the University rules. By the end of the 2nd semester the candidate submits to the Committee a progress report.</i></p> <p><i>During the 3rd semester, the candidate is required to attend the Department seminars, present his/her work in-progress and answer to the critics. By the end of the semester, the candidate will defend his/her thesis in front of the Committee. The candidate can prolong the completion of his/her thesis within the permitted time frame allowed by the University rules. In such a case, a written request must be submitted to the Department.</i></p>	
Semester(s) in which the course is taught	2-4	
Person responsible for the course		
Language	English	
Relation to curriculum	Compulsory	
Teaching methods		
Workload (incl. contact hours, self-study hours)		
Credit points	53	
Required and recommended prerequisites for joining the course	None	
Course objectives	<p>The goal of the thesis is to give the opportunity to the candidate to prove that he/she has the capability to solve a scientific/engineering issue in a systematic way and in-depth. The investigation will help to advance knowledge of human biological processes or to develop a new medical device. The results must be publishable either in the form of an article in a peer-reviewed journal or a patent of invention.</p>	
Course learning outcomes	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO 1: Proficiency in core Biomedical Engineering principles

		CLO 2: Advance knowledge in research methodology CLO 6: Basic knowledge in Bioethics in scientific research
	Skill	CLO 3: Capability in conducting and mentoring research in BME CLO 4: Proficiency in communication and pedagogical skills in inter and multidisciplinary environment
	Attitude	CLO 5: Capability of appreciation and critics of research works
Content	<i>The description of the contents should clearly indicate the weighting of the content and the level.</i>	
Examination forms	Report, presentation, publication	
Study and examination requirements		
Reading list		

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-6) and ASIIN Intended Learning Outcomes (ILO) (1-6) is shown in the following table:

	ILOs																			
	ILO.1		ILO.2				ILO.3			ILO.4				ILO.5				ILO.6		
CLO	1.1	1.2	2.1	2.2	2.3	2.4	3.1	3.2	3.3	4.1	4.2	4.3	4.4	5.1	5.2	5.3	5.4	6.1	6.2	6.3
1.1	X,5	X,5		X,5	X,5	X,5				X,5	X,5		X,5							
1.2								X,5		X,5	X,5	X,5					X,5			
2.1							X,5	X,5		X,5							X,5			
2.2			X,5	X,5			X,5	X,5						X,5		X,5				
3.1																		X,5		X,5
3.2				X,5						X,5		X,5							X,5	X,5
4										X,5		X,5		X,5	X,5			X,5		X,5

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
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	Research proposal defense	1,2,3,5	Research proposal		
	Thesis Defense	1,2,3,4,5,6	Thesis report, Thesis Defense		
	Manuscript		Publication		

4. Assessment plan

Assessment Type	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6
Research proposal and Proposal Defense	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass
Thesis report and Thesis Defense	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass
Publication						
Homework exercises (20%)						
Midterm exam (30%)						
Final exam (40%)						

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

5.1. Grading checklist for Written Proposal and Manuscript

Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		

Clear and easy to read	10		
Quality of Layout and Graphics (10%)	10		
TOTAL SCORE	100		

5.2. Master thesis evaluation form for academic advisor

<p>1. Student's Information:</p> <p>Name: _____ ID: _____</p> <p>Advisor's name: _____</p> <p>Thesis: _____</p> <p>2. Comments of advisor:</p> <p>a) Does student demonstrate a well understanding of the research problem through comprehensive exploration of existing knowledge in the literature and realization of the knowledge gap(s) to be addressed in the thesis?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>b) Does student clearly formulate the research problem and identify realistic constraints?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>c) Does student use appropriate methods, tools and instrumentation to solve the research problem?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>d) Does the result meet or exceed the research objectives?</p> <p>.....</p> <p>.....</p> <p>e) How does student conduct evaluation of the result's validity and reliability or perform the designed system, component, or process?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>f) How does student recognize the significance of the problem solved in the research, including positive and negative impacts (if any), and project the applicability of the solution?</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>g) Does student have a clear and well-structured written report in the correct format?</p> <p>.....</p> <p>.....</p> <p>.....</p>
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h) Recommendations about student's Attitude.

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Date:

Signature

5.3. Master thesis comment form for reviewer

Student Name:

Student Number:

Intake:

Specialization:

Title of Paper:

Date:

Supervisor (Name):

Reviewer (Name):

1. Content of the Thesis

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2. Significance of the Thesis

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3. Strengths of the Thesis

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4. Weaknesses of the Thesis

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5. Evaluator's Proposal: Qualified for Defending or Unqualified for Defending?

6. Challenging questions (please raise 2 questions):

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7. General Evaluation: _____ Grade:* _____

(* Hints for your grading)

	Maximum score	Score
CONTENT	100	
Formulation research question (problem statement, research question)	15	
English writing and Grammar	10	
Relevance of approach (Availability of information and data, treatment of data, reliability of data)	20	
Scope of analysis (Application of concepts, structure and consistency of argument/logic, problem solution)	30	
Strength of conclusions and recommendations (Generalizability, internal coherence, awareness of limitations)	10	
Form (Style, structure, abstract, bibliography and references)	15	

Date:

Signature

4. Master thesis evaluation form for member of master thesis grading committee

Student's name:	ID:		
Thesis title:			
Supervisor (Name):			
No.	Criteria	Maximum score	Score

1	Usefulness and applicability of the work	20	
2	Research methodology	20	
3	Oral presentation	20	
4	Defense	20	
5	Thesis report	20	
Total		100	

Questions/Comments

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Name of Examiner

Date of Signed

COURSE SYLLABUS
Course Name: Project Study
 Course Code: BM650

1. General information

Course designation	<i>Students undertake a research topic. The research topic should be related to the research orientation given in the Research proposal. The content of the topic is divided into two parts: theory and practice. Students research documents and synthesize information and knowledge related to the research topic. Besides, students perform experiments related to the given topic.</i>	
Semester(s) in which the course is taught	2	
Person responsible for the course		
Language	English	
Relation to curriculum	Compulsory	
Teaching methods	Project	
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 90 Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 45 Private study including examination preparation, specified in hours: 45	
Credit points	9	
Required and recommended prerequisites for joining the course	None	
Course objectives	The goal of the course is to provide the opportunity to demonstrate that they are capable of solving a scientific problem in the field of medical examination in a systematic and in-depth manner. The results must be published in the form of a scientific article in a peer-reviewed scientific journal or a patent.	
Course learning outcomes	Upon the successful completion of this course students will be able to:	
	Competency level	Course learning outcome (CLO)
	Knowledge	CLO 1: Proficiency in core Biomedical Engineering principles CLO 2: Advance knowledge in research methodology CLO 6: Basic knowledge in Bioethics in scientific research
Skill	CLO 3: Capability in conducting and mentoring research in BME	

Content	<p><i>The description of the contents should clearly indicate the weighting of the content and the level.</i></p> <p>Weight: lecture session (3 hours)</p> <p>Teaching levels: I (Introduce); T (Teach); U (Utilize)</p>		
	Topic	Weight	Level
			I, T, U
			I, T, U
			I, T, U
			I, T, U
			I, T, U
			I, T, U
			I, T, U
			I, T, U
			I, T, U
			I, T, U
Examination forms	Report, presentation		
Study and examination requirements			
Reading list			

2. Learning Outcomes Matrix (optional)

The relationship between Course Learning Outcomes (CLO) (1-6) and ASIIN Intended Learning Outcomes (ILO) (1-6) is shown in the following table:

	ILOs																	
	ILO.1			ILO.2			ILO.3			ILO.4			ILO.5			ILO.6		
CLO	1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	4.3	5.1	5.2	5.3	6.1	6.2	6.3

3. Planned learning activities and teaching methods

Week	Topic	CLO	Assessments	Learning activities	Resources
	Project	1,2,3,6	Report, Presentation		

4. Assessment plan

Assessment Type	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6
Project (100%)	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass	50%Pass

Note: %Pass: Target that % of students having scores greater than 50 out of 100.

5. Rubrics (optional)

Grading checklist for Written Reports			
Student:	HW/Assignment:		
Date:	Evaluator:		
	Max.	Score	Comments
Technical content (60%)			
Abstract clearly identifies purpose and summarizes principal content	10		
Introduction demonstrates thorough knowledge of relevant background and prior work	15		
Analysis and discussion demonstrate good subject mastery	30		
Summary and conclusions appropriate and complete	5		
Organization (10%)			
Distinct introduction, body, conclusions	5		
Content clearly and logically organized, good transitions	5		
Presentation (20%)			
Correct spelling, grammar, and syntax	10		
Clear and easy to read	10		
Quality of Layout and Graphics (10%)			
10			
TOTAL SCORE		100	