

Subject Description Form

Subject Code	BSE4723
Subject Title	Research Project
Credit Value	6
Level	4
Pre-requisite	Any 4 of: BSE3123 Power Distribution BSE318 Lighting Technology BSE3225 HVACR I BSE3226 HVACR II BSE3312 Piped Services BSE3321 Fire Services
Co-requisite Exclusion	Nil Nil
Objectives	<p>Research project is undertaken by students with the aim of developing the skills and abilities to undertake, independently, a major piece of investigation work in a specialist subject area. The research is conducted over 2 consecutive semesters in the BEng (Hons) programme. Students will focus on Research Project Development and on Research Project Execution in 2 consecutive Semesters with advices from an academic supervisor.</p> <p>The research work shall be related to and integrate with previous and current academic studies. It is intended to allow students to develop and practise research skills. The nature of work will be similar to the type of investigation sometimes required in professional practice. The tasks to be accomplished by the students in this subject include, but not limited to below,</p> <p>Project Development Focus</p> <ol style="list-style-type: none"> a) completion of a thorough literature review, which leads to define the focus of the study and the programme for undertaking the work; b) development of the project theme, with realistic and realisable aims and objectives; c) planning of the supporting practical work (this may be fieldwork, site investigations, laboratory studies, computer simulations, etc., and can start early in the project if access to site, etc., is available); and <p>Project Execution Focus</p> <ol style="list-style-type: none"> d) demonstrate the ability to carry out applied research in a critical manner, through adequate planning, proper methodology, and the correct selection and use of equipment, and where appropriate, computer software; e) demonstrate the ability to critically evaluate information and data; f) communicating clearly and concisely the progress and final outcome of the study; and g) demonstrate good management of time and resources available for the project.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a) practice application of theories in a specialist subject area; b) plan the supporting practical work (experimental, fieldwork, site investigations, laboratory studies, computer simulations, etc.) for investigation in a specialist subject area; c) independently develop the skills and abilities to undertake major investigative project work related to a specialist building service subject area; d) demonstrate an ability to carry out applied research in a critical manner, through adequate planning, development of an appropriate methodology and by selection of suitable equipment / computer software; e) demonstrate an ability to collect and critically evaluate data related to building services engineering;

	<p>f) communicate clearly and concisely the progress and outcome of the study; and</p> <p>g) demonstrate good time management for the project.</p>
<p>Subject Synopsis/ Indicative Syllabus</p>	<p>Listed below are some examples for project areas:</p> <ul style="list-style-type: none"> • Acoustic and noise control • Building automation • Built environment • Electrical engineering • Energy saving for buildings • Facilities engineering and management • Fire and safety • Indoor environmental quality • Refrigeration • Renewable energy • Ventilation and air-conditioning • Water supply and drainage <p><u>Literature Review</u></p> <p>The student shall detail the key reference material used in developing the project aims and objectives, and methodology proposed. The outcome of the literature review shall be presented in a summary document, which shall form part of the Project File and to be assessed as a separate item. Whilst it does not exclude reference to the research literature, the initial focus is to be on professional publications, local, regional and international guides, codes of practice, standards and similar publications. The study is expected to make proper reference to literature, and not simple copy text. Examples of technical publications include:</p> <ul style="list-style-type: none"> • Academic journal articles • Conference proceedings • WHO guidelines on indoor environmental pollution. • ASHRAE Standards and Handbooks. • CIBSE guides on design and operation. • NFPA Standards and Handbooks. • BS, ISO and IEC Standards. • Codes of practice, Hong Kong Government.
<p>Teaching/Learning Methodology</p>	<p><u>Project Planning</u></p> <p>The student shall take account of available resources, site access, time, etc., when refining aims and objectives when determining a project plan.</p> <p>The student shall develop a clear and concise methodology for any practical work proposed. It is possible that some practical work may be undertaken, for example, when site access is available for measurements. A checklist for site work (in Project Execution below shall be observed).</p> <p><u>Project Proposal</u></p> <p>The project proposal should aim to place the research study into the right context and scope of work. It should be a critical review of relevant literature, enabling the student to understand all relevant factors and to decide on the specific project plan. In order to have practical relevance it is essential that all technical aspects demonstrating problem solving skills, critical thinking and initiative are considered, with examples given below,</p> <ul style="list-style-type: none"> • Has the student undertaken a literature search of sufficient breadth and depth to enable satisfactory project planning to proceed (accepting that additional material may be searched subsequently)?

- Has the student identified, read and understood the relevant material, and presented a summary review of findings relevant to the project aims (i.e., critically evaluated the material)?
- Has the student demonstrated an understanding of the key issues and developed the initial aims and objectives sufficient to proceed with the project as planned?
- Has the student defined a sound methodology to accomplish the objectives and have it tested?
- Has the student demonstrated a project plan?

Students will submit project proposal giving the title and objectives, reporting on the conclusions of the literature review, outlining the initial project plan, and identifying the possible deliverables. It will identify the project aims more clearly and the programme for execution. The academic supervisor will act as the Group Co-ordinator and will assess the proposal. The Group Co-ordinator will provide assessment and feedback. Copies of all key reference material (except Copyright material) will be included in the Project File.

Record of Meetings and Activities

A record of all activities is to be maintained by the student. It shall record time spent at meetings, on self-study, on site investigations, etc. The record shall be checked periodically by the Group Coordinator. It should be brought to all meetings, updated regularly and submitted with the Project File.

Intermediate Presentation

At the end of 1st Semester, an intermediate presentation takes place before a group of academic staff. Each student is required to give a presentation on their works done and to answer questions in front of an assessment panel. Assessment by each member of the group is rationalised to a single score.

Project plan refining

The student shall have taken account of available resources, site access, time, etc., when refining aims, objectives and project plan, where deemed to be necessary in the execution of the work.

Project Execution

- Students must obtain the approval of their Group Coordinator before embarking on any site surveys or measurements. Relevant approval shall be obtained from governing bodies (e.g. human ethic, animal ethic, laboratory safety). The methodology must be clearly defined and resources identified.
- Students will be expected to learn how to use equipment.
- Students must gain proper permission to enter sites for the purpose of conducting surveys or measurements. Where a project is initiated by the department, the department will help arrange access.
- Where equipment is to be transferred for use on site an Equipment Loan Form must be completed.
- Students must gain approval from the Department for survey questionnaires before they are issued.

Project File

Each student maintains a file containing all relevant information and data for the project:

- Record of meetings and activities, feedback from supervising staff, correspondence etc.
- Interim review, project proposal, project paper and comments from assessors.
- Copies of major references used (except copyright material).
- Project notes, site and survey data, summary of equipment, software, etc.
- Any site/system/equipment drawings, catalogues, etc.
- Site/laboratory measurement data.
- Summary of hours spent in meetings with supervising staff and clients, self-study, practical

work, etc.

Files on Disk

All text, graphics and data files relevant to the project are submitted with the Project File. This includes the Paper. These will be electronically submitted via Blackboard in the end of the 2nd Semester and/or format deemed appropriate.

Research Paper

At the end of the 2nd Semester, it is required to submit a final research report. The report should cover the complete research work carried out in both Semesters. The report is to be written in a style suitable for reading by BSE professionals. The content of the report should include an abstract, an introduction, the methods, analysis, conclusions and any others deemed appropriate.

The introduction part should give the background, and a summary of the literature review, and the aims and objectives of the project; the methods part shall present the methods used, such as site survey, laboratory experiments or computer simulation, and list the scopes of the work to be undertaken. The result part shall include findings and data analysis, such as a comparison with relevant standards, verification, application or rejection of a theory, model or guidance, identification of the cause of a problem, etc. In this part, table/graphs shall preferably be used. At the end of the report, conclusions should be given.

The format of the paper shall be:

- The body of the paper is a maximum of 8 pages A4. Single column text. Minimum 10 pt, e.g., Times.
- The pages of text and diagrams /graphs can be mixed (e.g., 6 text, 2 illustrations /tables /graphs), but maximum 8 pages.
- Only references, which are clearly mentioned in the text, shall be listed. Full citation to be given.
- Figures, charts and tables, including all labels, to be clearly legible. Minimum font size 8 pt, e.g., Helvetica.
- Acknowledgements are to be included at the end of the paper.
- The paper shall include a disclaimer signed by the author declaring the originality of the work.
- The paper shall go through similarity check, e.g. by Turnitin, given a similarity index must not be more than 30%. The checking report shall be submitted together with the paper.

Final Presentation

At the end of the 2nd Semester, a final presentation takes place before a group of academic staff, and may include outsiders. Each student is allocated a presentation period for their findings and then followed with a question and answer session. Assessment by each member of the group is rationalised to a single score.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						
		A	b	c	d	e	f	g
Coursework	100	✓	✓	✓	✓	✓	✓	✓
Total	100							

Assessment Key

1st Semester

Sem. Week	Assessment Element	Assessors	Assessment Elements	Weighting
7	Project proposal	Group Coordinator	Synthesizing existing research, Identifying research objectives, Developing methodology, Grammar,	20%

			spelling and presentation	
13	Intermediate Presentation	Group of staff	Supporting material, Organization, Delivery, Subject knowledge	10%
1-13	Project Development	Group Coordinator	Problem solving skills, Critical thinking, Initiative	10%
<u>2nd Semester</u>				
Sem. Week	Assessment Element	Assessors	Elements	Weighting
13	Research Paper	Group of Staff	Solving research problem, Quantitative literacy, Analyzing data, Drawing conclusion, Grammar, spelling and presentation	30%
13	Presentation	Group of staff	Supporting material, Organization, Delivery, Subject knowledge	15%
1-13	Project Execution	Group Coordinator	Problem solving skills, Critical thinking, Initiative	15%
<p>The marking scheme used by the assessors for various assessment elements are given in the assessment rubrics. The grades may be subject to overall review and rationalisation of grades between groups by the Research Project subject examiner.</p> <p>The aggregate percentage will be converted to the appropriate subject grade.</p>				
Student Study Effort Expected	Class contact:			
	▪	Group /Individual meeting		52 Hrs.
	▪	Experiment/Site survey/ Simulation		26 Hrs.
	Other student study effort:			162 Hrs.
	Total student study effort			240 Hrs.
Reading List and References	Nil			