CITY UNIVERSITY LONDON

City University London

School of Mathematics, Computer Science and Engineering

Department of Electrical and Electronic Engineering

EE3400 Individual Project BEng 3

Handbook

CITY UNIVERSITY LONDON

1. INTRODUCTION

This document gives a detailed explanation of all procedural, academic and other challenges you will face while working on the Year 3 Individual Project.

To qualify for the award of a BEng (Honours) degree, a student must undertake, complete and pass a Year 3 project. This module has code EE3400 and carries a weighting of 30 academic credits. The project forms a major part of the work in Year 3 and represents the culmination of studies on the programme. It is a substantial and important part of the programme, involving a significant piece of independent work undertaken by a student.

The Project provides you, the student, with the opportunity to develop your ability to work independently, making your own contribution to the subject area and drawing conclusions therefrom. The project contributes a significant mark towards the final degree classification and **an honours degree cannot be awarded if** the project is deemed to be **unsatisfactory**. The minimum pass mark for project is 40%.

2. AIMS AND OBJECTIVE OF THE PROJECT

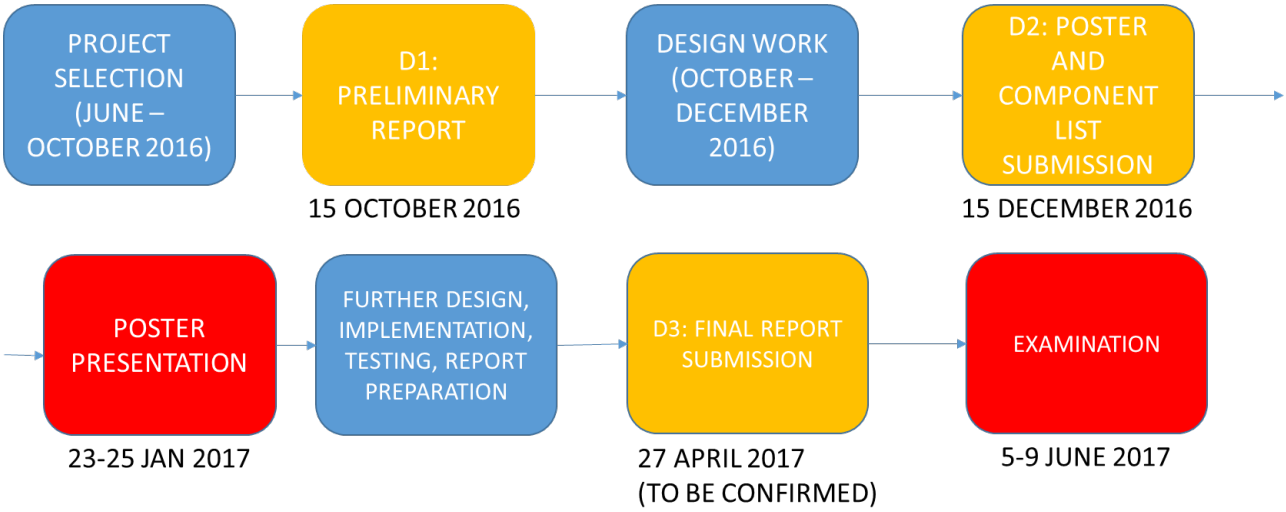
The Year 3 Individual Project has the aim to develop and demonstrate your ability to:

(i) plan a major piece of work
(ii) carry out preliminary study
(iii) organise the acquisition of necessary equipment and components
(iv) liaise with staff and other students
(v) set a number of targets
(vi) work independently to attain the targets
(vii) communicate progress with a supervisor
(viii) reorganise plan to accommodate unforeseen problems
(ix) complete the work to time
(x) present an oral and written report of the work

The main objective for the project is to gain experience in individual work, in solving engineering design problems, in setting and working towards targets, and to develop the skills required to communicate clearly the important results obtained during the development work. By the end of the project you should have developed an understanding of the initial problem even if a final solution has not been developed.

3. SUMMARY OF DELIVERABLES AND PROJECT TIMELINE

The following diagram gives you the overview of the main deliverables and activities you need to undertake during the Year 3 Individual project:



4. SELECTION OF PROJECT TOPICS

A project needs to be closely related your programme of study, and should ideally contain a significant design work and prototype development work. In all cases, in selecting a project topic careful consideration should be given to such critical factors as the relevance of the topic to the programme of study, actuality and complexity of the problem to be tackled, and your own interests and career aspirations.

A project topic may be selected in one of the following ways:

(a) From the published list of project topics by academic staff
(b) From a student's own idea
(c) From a sponsoring company.

The list of project topics is distributed by email to all Year 2 students at the beginning of the Summer Term (Term III). This list constitutes a rich source of project topics. Each topic on the list carries a short summary and the contact details of the potential supervisor who has provided the topic.

You are advised to speak to as many academic members of staff as possible with regard to your project topic selection, especially if you would like to get some additional advice on a topic you have chosen from your own idea.

In late May and early June, you will be asked to submit your preferences with regard to the supervisor. This will be done using the **PROJECT SUPERVISOR PREFERENCE SELECTION FORM.** You will be asked to identify four preferred supervisors. Following the June Assessment Board, the Project Coordinator will allocate the supervisors on the basis of students' preferences and – in the case of popular supervisors – on the basis of results in the examinations and coursework sin Year 2. Final list of supervisors is distributed by email in late June.

In selecting and undertaking a project, you must bear in mind that a project must be supervised by a permanent member of the academic staff within the Department of Electrical and Electronic Engineering. No project work undertaken without the supervision by such a supervisor will be considered for assessment. A project work should have sufficient technical and/or critical content to be considered for a BEng project. A project report must clearly show the personal contribution of the student to the work undertaken. Collated works from existing published sources will not normally constitute a viable project.

You should also understand that the project is your individual work. **You are free to take ideas and inspiration from the project topic list of all academics, regardless of whether they have been allocated as your supervisor.** During the course of the year, we will make sure there is not too much overlap between the project topics.

5. THE PROJECT WORK

a. Laboratory Access

The Finkelstein Undergraduate Laboratory is available for you to work on your Project. There are rules on getting the access to the Laboratory, which will be published on Moodle.

While in the Laboratory, it is essential that the Project students follow the rules of using the Laboratory, and to show respect to the laboratory session which may be taking place while they are there.

A student may, however, work in other areas if this is more appropriate - i.e. within a research group's laboratory space with access to specialised equipment or in computer laboratories. If access to specialised equipment is required this must be discussed and agreed with the project supervisor and relevant laboratory technicians with the appropriate risk assessment having been made.

b. Hardware and Software

Where a project involves the construction of hardware, a range of commonly used electronic components is available from the Electronics Undergraduate Teaching Laboratory. Items stocked include resistors, capacitors, diodes, general purpose transistors, a limited range of 74ls series integrated circuits and assorted hardware.

Hardware for project items can be purchased by the Department. The procedure for this is simple and will be explained in a separate document, which will be available on Moodle. This process will include completing a special purchase form, having it approved by the supervisor and then passing it on to the Laboratory technician for submission. The project budget is limited (typically to £100) and not all requests may be granted if there is not a strong supporting case. Cheaper alternatives may be available.

All requests must be discussed with the Laboratory Technician and with your supervisor. Please note that the Department will be able to make a purchase from selected providers only. The list of these will be published on Moodle or can be clarified by the Laboratory Technician. Once the final list of items is made, a request form must be filled and emailed to the Head of Department, with a copy to your supervisor.

Money cannot be refunded for any purchases outside the University. It should be noted that all items purchased for project work remain the property of the University and should be returned after the project examination.

c. Workshop

Construction of any equipment for projects requiring the use of workshop facilities should be discussed with the Project Supervisor and Laboratory Technician at the earliest opportunity. Demand for workshop facilities can be great and delays in manufacture cannot be ruled out.

d. Health and Safety

Prior to the commencement of any work on the project, all project supervisors must complete risk assessments irrespective of the work involved. Even if there is no obvious risk it is necessary to complete a basic safety assessment. This should record that the assessment took place and no hazards were identified. If any hazards were identified a detailed risk assessment should be carried out which should state how the hazards are to be managed. This is required to comply with the Health and Safety Regulations. Students carrying out experimental work in the laboratories must take all reasonable safety precautions. Any safety-related problems should be reported to the project supervisor and the staff responsible for the laboratory. Further advice may be sought from the members of the School Safety Consultative Committee.

e. The Project Supervision

As mentioned earlier a Year 3 project must be supervised by an academic supervisor. The supervisor advises and consults students and points to the strategic directions of the work involved. Students are expected to work out the details of the project and carry on with the work unaided. The supervisor assists and monitors the progress of the work and is responsible for the assessment of this part of the project. The supervisor is also concerned with such factors as the student's general approach and enthusiasm, ability to identify and discuss problems, recognition of deviations from the work plan and corrective actions taken, general practical and theoretical ability, etc.

It is therefore important, and also **the responsibility of the student** to meet and report to the supervisor regularly. It is recommended that a student would meet the supervisor once every week for about thirty minutes. It should be noted that the supervisor will be marking Project Management for each project, considering factors such as project planning, technical achievement and ability to progress independently. This mark in total contributes to 20% of the project mark.

The first meeting with the project supervisor should be during the summer. Depending on the availability of the supervisors and the students, email discussion can replace a person-to-person meeting.

6. PROJECT MANAGEMENT AND THE DELIVERABLES

There are four main deliverables in the Year 3 BEng Project:

- **The Preliminary Report (deadline 15 October 2016)**
- **The Project Poster (deadline 15 December 2016)**
- **The Project Final Report (deadline 27 April 2017) – this date will be confirmed**

In addition to these deliverables, you will need to make two presentations:

- **Poster Presentation (to be scheduled around 20 January 2017)**
- **Final Examination (5-9 June 2017)**

a. Assessment

The Project is assessed throughout the year. Table below shows the assessment elements with short descriptions:

Assessment component	Weighting	Comment
Preliminary Report	10%	Mark will be given within three weeks from the Preliminary Report submission
Poster Presentation	10%	Mark will be given after the Poster presentation, in late January
Project Management	10%	Mark will be given at Project examination in early June
Quality of the Project Work	50%	Mark will be given at Project examination in early June
Project Presentation	20%	Mark will be given at Project examination in early June

b. The Preliminary Report

The Preliminary report is the first Project deliverable. Ideally, this report should include:

- Clear specification of project objectives
- Brief research into the field of study,
- Brief description of the industrial relevance of the Project (where applicable)
- Project timeplan
- A preliminary (conceptual) prototype design (optional)

Around 6000 words long, the preliminary report should contain the problem definition, main aims and objectives of the project, a summary of the research done on the topic of study (with references!), project timeplan, explanation of the industrial relevance of the project objectives and (ideally) a very preliminary conceptual design of the prototype. Whilst following these guidelines, in writing up the preliminary report, you should always consult and seek advice from the project supervisor regarding the specific contents and overall requirements for the report, which may vary depending upon the project topic chosen.

All students must use the same format for the standard title page for the preliminary report. The layout will be provided on Moodle (paper size A4, left margin 4 cm, right margin 2.5 cm, top margin 3 cm and bottom margin 2.5 cm, header 0 cm, footer 1.5 cm; the City University logo goes within the top margin).

Once completed the preliminary report must be submitted on Moodle, using the link which will be provided on EE3400 Moodle space. *The report must not be submitted to the supervisor directly, or to the Programme Director of the course*.

In marking the preliminary report, supervisors are advised to consider the following points: (a) clarity of project objectives; (b) quality of literature survey, (c) choice of techniques to be used, (d) work plan explicitly drawn up.

All preliminary reports will be tested for plagiarism. Feedback you get from the Preliminary report is essential for the successful completion of the Final Report.

When specifying the project objectives the following should be specified:

- project title
- list of project objectives (typically they should be presented as a bulleted list following a sentence: "*The main objectives of this Project include:* "). At least two of the objectives should follow the words '*To develop detailed knowledge in the field of…*'. Unless you are on BEng Engineering with Management and Entrepreneurship programme, there will be an expectation that the Project will include a full prototype design, implementation and testing, and this should be reflected in the objectives list.
- up to 200 words description of the project idea, motivation behind it, and the field of study related to the project.

The Preliminary report should also outline the main actions that will be taken to complete the project. Some of the typical actions your Individual Project will include are:

- Research on the specified field of knowledge related to the project
- Full requirement specification
- Conceptual Design
- Preliminary report writing
- Subsystem Analysis and Design
- System Integration
- Preparation of the poster and poster presentation
- Testing
- Final Report Writing

The Preliminary Report should include a timeplan – either as a *Gannt* Chart or similar project management plan, or as a simple table. Steps in project development should be included with

approximate dates of completion for each step. Please note that this is your first attempt to develop a Project specification, and changes with regard to the time plan are possible later in the Project.

The industrial relevance of the project at this stage should be emphasised by using some references to the state-of-the-art technology in the field you chose to analyse for your project.

c. The Project Poster

The Project Poster is considered to be a progress presentation of the work done during the autumn term. You will be required to submit a poster on Moodle with a submission deadline of 15 December 2016. Please note that this deadline is officially in your holiday period, so feel free to submit the Project Poster early. A 15 minute presentation of the poster will be scheduled after the January examination period.

A poster should include project title, description of the background research in the field of study, conceptual design on the prototype (or model, or research, in the case the Project does not include prototype development). As special session will be timetabled to give you examples of good and bad poster design.

It is very important to note that any components that you may require for the Project has to be ordered before the poster submission deadline of 15 December. NO ORDERS WILL BE MADE AFTER THIS DEADLINE. The exact procedure for ordering components will be available on Moodle in September.

7. The Final Project Report

The Final Project Report is the key deliverable for your work. There is a very strict deadline for the submission of the Final Report. The deadline will be at the end of April, most likely on 27 April 2017, although this date will be confirmed in September.

You can see later in this document a number of rules and advices on how to prepare the Final Project report. The Report is typically 50-60 pages long. It should contain research into the field of study, with clear references to the industrial relevance of the work (where applicable), detailed description of the technical problem the Project solved, detailed description of the design of the solution for this problem, and detailed description of the prototype solution and its testing.

For Projects which do not include development of a hardware or software prototype (typically some of the Projects on the BEng Engineering with Management and Entrepreneurship), a more detailed research is expected and a Chapter outlining the importance of the research for the future industrial or research landscape.

The length of the report is not specified but as a general guide, the average length is approximately 15000 to 20000 words of text plus illustrations with optional up to 30 pages of appendices. A report which is excessively large may be penalised if there is too much irrelevant material. During the last few weeks of the Spring Term (Term II) a student should have completed all of the practical work on the project and be writing up the report. It is recommended that a student should do no further new work after this time. For the format of the report students are required to adhere to the guidelines given in the sections below. *A project report may be marked down for not conforming to these guidelines*.

Before starting to write up a report a student needs to consider the readership that the project will be addressed to. This includes the supervisor, the co-examiner, future students and possibly the future employers who should be told the tasks involved and the work done to solve the tasks and meet the aims and objectives of the project. It is therefore important to write in a clear and precise style, putting in the essentials but rigorously excluding anything irrelevant or obscure.

The style of writing should be objective but at the same time clear, concise and convincing. One way of conveying objectivity is to consistently use the **passive past tense**. For example, instead of typing

"I developed a 3D model so that I could investigate…" **INCORRECT**

It would be grammatically correct to use

"A 3D model was developed to investigate …" **CORRECT**

The information must be systematically presented and fully and accurately documented. Logical presentation is achieved by correct paragraphing and careful sentence construction. Any words, or acronyms, peculiar to the project must be defined and explained, and care taken to ensure that all statements are correct. The report is only a means to an end, that of conveying to the readers what has been achieved and the standard of the work done and to distinguish the work from that of others which may have been included as part of the background material.

a. Structure of the Project Report

The structure of the report should follow the standard format for report writing. The following headings, not all of which will be necessary in all reports, could form a suitable structure. There may be additional headings that are appropriate in certain circumstances. A student should seek advice from the project supervisor as to the headings that are applicable to the work involved.

- Standard title page*
- Abstract*
- Table of contents*
- Symbols and abbreviations
- Introduction*
- Previous work
- Research into the chosen field of study and analysis of state-of-the-art technology
- Theory, methodologies developed/used
- Work done and results obtained*
- Discussion of results*
- Conclusions (including a clear statement of what has been achieved)*
- Suggestions for further work
- References*
- Acknowledgements
- Appendices

* The headings/chapters that are starred are mandatory and must be included in any project report.

Standard Title Page

The title page for all project reports must conform to the same standard template which will be made available on Moodle close to the submission deadline. *No other texts, illustrations, etc. apart from those shown on the template should be used on the title page*. *Except for the City University logo there must not be any use of colour on the title page*. The template given on Moodle can be copied and used for individual projects. The margins for the title page (paper size A4, left margin 4 cm, right margin 2.5 cm, top margin 3 cm and bottom margin 2.5 cm; header 0 cm footer 1.5 cm) are the same as those for the main body of the project. Please note that the title page should not have a page number.

Abstract

About 200 words long in the standard format, the abstract is essential and must be included in all reports. It should enable a reader to quickly assess the subject matter of the report, to learn the essentials of the work carried out and the principal conclusions. The format of the abstract is mandatory and must conform to the standard template shown in a template document which will be available on Moodle close to the submission deadline. *Project submissions will not be accepted if the abstract does not conform to the required format*.

A copy of this abstract will be included in the electronic database for project reports for future reference by staff, students and visitors. It must, therefore, be able to stand alone as a document containing all the information the reader will need to identify the report, its content and conclusions.

Table of Contents

Following the Abstract all project reports must have a Table of Contents showing the chapter, section and subsection headings with page numbers. These should be numbered using successive period marks. For example:

It is recommended not to subdivide more than this. In general, the second level of division is sufficient. Careful thought in drafting chapters should enable students to recast the report if a third level appears to be required.

Symbols and Abbreviations

All symbols and abbreviations used in the report should be used consistently and should conform to those recognised as standard in the field under discussion. Only SI units and corresponding standard abbreviations used for these units should be used. Any use of mixed units (e.g., SI and CGS) should be avoided as far as possible. A list of all symbols and abbreviations used in the project should be given under the heading Symbols and Abbreviations following the Table of Contents.

Introduction

The Introduction, which is an essential part of a project report, should give the background to the work, appreciation of its scope and its evaluation in relation to previous work. It should give an overview of the project and the report. It is recommended to include only those materials here that have been found to be relevant during the literature survey on the project, giving the full reference in the recognised format (see below). The Introduction should end with a subsection containing the clearly stated aims and objectives of the project.

Theory, Methodologies Developed/Used

Here the appropriate theory and/or methodologies on which the project work is based and which are required for the interpretation of results are described with relevant references. It is not recommended to include extensive text book work or extracts from published work unless they are essential to the understanding of the work that follows. When this is done it must be acknowledged by quotation marks and references. Such detailed work may be more appropriately presented as an appendix. The main heading and subsequent sub-headings of this section should be given titles relevant to the topic and to maintain a level of coherence throughout the report.

Work Done and Results Obtained

This essential part should be the backbone of the project report. Any theory that has been developed as original work and is essential to the project should be included here. Any essential formulae should be quoted and any relevant sources should be referred to in the references. However, too much theory often holds up report flow and can be better included in an appendix if it is deemed necessary. All results obtained should be extensively and analysed and discussed in light of the aims and objectives of the project. If appropriate, the accuracy and reliability of results should be discussed and attention should be drawn to any uncertainties and limitations.

Conclusions

This important part of a project must state what has been achieved giving a critical discussion of the implication of the results obtained. Conclusions should briefly summarise the main results obtained in the work by referring to the aims and objectives against which the success of the project will be judged. Care should be taken to keep this section short and concise. Materials contained in previous sections should not be repeated a lot but any suggestions for further work should be included if appropriate.

Appendices

These should contain material which is considered to be essential but which, as indicated above, would interrupt the flow of the main sections of the report. The reader can then decide if, and when, it is relevant to consult these sections. Appendices may also include data sheet on circuits or equipment which play an essential role in the project, or any code developed if a software project is undertaken. Please note that the appendices do not have to include everything you have done during the project. In the case of large amount of code produced in the project, you may want to decide to put only part of the code in appendices. Please contact your supervisor who can advise on this.

References

A numbered list of references must be provided under References. These should cover all papers, books and any other source cited or used during the course of the project work (excluding any materials that were not read or understood). All references listed under References must be cited in the text. Only one reference should be listed per reference number. The list of references should be arranged in the order of citation in text, not in alphabetical order. Each reference should be numbered consecutively in square brackets [1] in the order in which they appear in the text. The sentence punctuation follows the brackets [2]. Multiple references [3], [4] are each numbered with separate brackets [1]-[4]. In text, citations of references should be given simply as 'in [1] …' rather than 'in reference [1] …' except at the beginning of a sentence: 'Reference [1] shows …'. It is not necessary to mention the authors of a reference in the text unless the mention is relevant to the text. All authors' names should be used in the reference list unless there are four or more authors in which case 'et al' should be used after the first author's name. For personal communications addresses and affiliations should be given as in [12]. Footnotes, if any, should be numbered separately in superscripts and the actual footnote should be placed at the bottom of the page in which it is cited; footnotes must not be put in the reference list. It is however recommended to avoid footnotes by trying to integrate the footnote information into the text. Some examples of correct formats for various references are as follows (IEEE format):

Books:

[1] J. C. Maxwell, *A Treatise on Electricity and Magnetism*, 3rd ed., vol. 2. Oxford: Clarendon, 1892.
[2] S. H. Khan, C. G. Xie, and F. Abdullah, "Computer modelling of process tomography sensors and systems," in *Process Tomography: Principles, Techniques and Applications*, R. A. Williams and M. S. Beck, Eds. Oxford: Butterworth-Heinemann, 1995, pp. 325-365.

Periodicals:

[3] S. H. Khan, J. M. El-Shawish, L. Finkelstein, and K. T. V. Grattan, "Finite element modelling of saturation effects in commercial variable transformers," *IEEE Trans. Magn.*, vol. 37, no 4, Part I, pp. 2783-2786, July 2001.

Papers/Articles from published conference proceedings:

[4] S. H. Khan, K. T. V. Grattan, and L. Finkelstein, "Computer modelling and design of capacitive sensors", in *Proc. XVI IMEKO World Congress, IMEKO 2000*, Vienna, vol. V, pp. 61-66, September, 2000.

Papers presented at conferences (unpublished):

[5] K. Neumaier, D. Haller, S. H. Khan, and K. T. V. Grattan, "Finite element modelling of printed circuit boards," presented at the 17th MUG Annual International Conference, Portland, Oregon, October, 2000, unpublished.

Theses, dissertations, project reports, etc:

[6] S. H. Khan, "Development of the methods of computation of magnetic fields and static characteristics of linear step motors for control rod drives of nuclear reactors," Ph.D thesis (in Russian), St. Petersburg State Technical University, St. Petersburg, Russia, 1987.
[7] U. A. Mudugamuwa, "Development of a generic router model," Project report, City University, London, 2001.

Web sites:

[8] Cronos web page [Online]. Available: http://www.memsrus.com Date Accessed.
[9] [Online]. Available: http://www.staff.city.ac.uk/~re311/projects.htm Date Accessed.
[10] Intellsuite™. Intellisense, Inc.. [Online]. Available: www.intellisense.com Date Accessed.
[11] M. R. Douglass. Lifetime estimates and unique failure mechanisms of the digital micromirror device (DMD). [Online]. Available: http://www.dlp.com/dlp/resources/whitepapers/pdf/ieeir.pdf Date Accessed.

Miscellaneous:

[12] S. H. Khan, City University, EEIE, School of Engineering, Northampton Square, London EC1V 0HB, UK, personal communication, 2002.
[13] "MATLAB™ version 6," The Mathworks.
[14] M. Young, *The Technical Writer's Handbook*. Mill Valley, CA: University Science, 1989.

Preparation of the Project Report

The project report must be typed, in Times New Roman, with font size 12 pt, in one-and-a-half line spacing on one side of the paper sized A4. No text in the report should be less that 8 pt in size. The page setup should be as follows: left margin 4 cm, right margin 2.5 cm, top margin 3 cm and bottom margin 2.5 cm; header 0 cm footer 1.5 cm. Pages must be numbered consecutively throughout the report, excluding the front cover, including appendices, diagrams and graphs. Page numbers should be located centrally at the bottom of the page (bottom page 'footer'). All paragraphs should be justified and separated by a single (one-and-a-half line) spacing. The first line of the paragraph should not be indented. To emphasise a word/sentence italics should be used instead of underlying it.

The chapters and their main sections and subsections should be numbered as shown in Section 5.4.3. For chapter, section and subsection headings the following font sizes are recommended: chapter –16 pt (bold, left aligned, first letter of each important word is capitalised, not underlined, not italicised), section –14 pt (not bold, left aligned, first letter of each important word is capitalised, not underlined, not italicised), subsection –14 pt (not bold, left aligned, only first letter of the first word is capitalised, not underlined, not italicised). All headings should be short and to the point. A single (one-and-a-half line) spacing should be left after and/or before a heading.

The paper for printing the report should be of good quality and of sufficient opacity to ensure that the print does not show through the reverse side. The use of a laser printer is strongly recommended for printing. For inkjet printers, letter quality printing must be used. Unless it is absolutely necessary the use of colours for texts is not recommended.

Mathematical Notations

For all mathematical objects in the report either Microsoft Equation Editor or the MathType add on for MS Word should be used, if you use Microsoft Word. Use of Latex is highly recommended, particularly for proejcts with significant use of mathematical formulae. A mathematical object is any equation or fragment containing mathematical symbols (including Greek characters, superscripts and

subscripts) that appears either in-line (in the flow of normal text) or as a display equation (in its own space between lines of text). The use of Word fonts or symbols for in-line single variables with superscripts or subscripts should be avoided.

For all equations a single (one-and-a-half line) spacing should be used to separate them from text. All equations should be numbered consecutively with equation numbers in parentheses flush with the right margin (right aligned), as in (1). Equations should be punctuated when they are part of a sentence, as in

$$\frac{\partial}{\partial x}\left(\frac{1}{\mu}\frac{\partial A}{\partial x}\right)+\frac{\partial}{\partial y}\left(\frac{1}{\mu}\frac{\partial A}{\partial y}\right)=-J_S+j\omega\sigma A. \qquad (1)$$

The above equation is written using the default font size of MS Equation 3.0. The symbols in the equation must be defined either before the equation appears or immediately following it. An equation should be referred to in the text by its number as '(1)', not 'Eq. (1)' or 'equation (1),' except at the beginning of a sentence: 'Equation (1) is …'.

Figures and Tables

Figures, tables and all other illustrations used in the project report should be sharp, noise free and of good contrast. Lettering on tables and illustrations should be large enough to be easily legible and should be at least 8 pt in size. All tables and illustrations should be centred on the page and separated from texts above and below by at least a single (one-and-a-half line) spacing. Tables and illustrations should have distinct sequences of numbering. Each may run continuously through the report, or the number of an illustration or table may incorporate the number of the chapter or section in which it is bound (e.g. the third illustration of chapter 4 may be numbered 'Fig. 4.3'). Tables and illustrations should be placed nearer to where they are first mentioned in the text. *There must not be any tables and illustrations in the report that have not been referred to at least once in the text*.

Figure captions should be placed below the figures and table titles above the tables. For these the recommended font size would be 10 pt. A figure should be referred to in the text as 'Fig.' even at the beginning of a sentence. The word 'Table' should not be abbreviated. To avoid any confusion in graph axis labels words rather than symbols should be used. Any units should be put in parentheses. As in Fig. 1 below, for example, the 'Output Voltage, V (V)' should be used not just 'V (V)'. The graph axes should not be labelled with a ratio of quantities and units (for example, 'Output Voltage, V (V)' should be used, not 'Output Voltage/V' or 'Output Voltage, V/V').

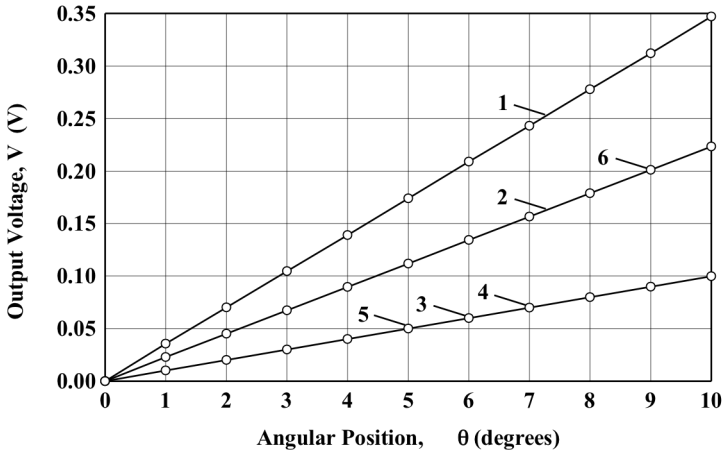


Fig. 1. Variation of output voltage with angular position for the 4-electrode capacitive angular position sensor showing the effects of permittivities of dielectric materials in the sensor: **1**– ε_7=1, ε_2=ε_9=1; **2**– ε_7=3, ε_2=ε_9=1; **3**– ε_7=10, ε_2=ε_9=1; **4**– ε_7=10, ε_2=ε_9=3; **5**– ε_7=10, ε_2=ε_9=10; **6**– ε_7=3, ε_2=ε_9=10.

Table 1 Calculated values of various geometric and electric parameters of the solenoid valve for various conductor sizes (conductor diameter d_c) of the coil.

#	d_c	A_c	A	A_e	N	S	L	l_t	l_s	R
	mm	mm^2	mm^2	mm^2	-	mm^2	Mh	mm	Mm	Ω
1	0.3	0.0707	27.06	14.883	210	14.43	3.998	25.1	5271	1.285
2	0.5	0.1963			76		0.523		1907.6	0.167
3	0.8	0.5027			30		0.0815		753	0.026

Helpful Hints

It should be remembered that black ink gives the best photocopies; coloured inks frequently fail to print. This also applies to certain colours of graph paper. It may therefore be necessary to line in the ordinates. Also coloured inks used in plotters and printers may fade with age.

For electrical circuit diagrams standard symbols should be used. These are given in NBS3939. As far as possible good captions, titles, etc. for illustrations and tables should be used so that they are self-explanatory.

Before final printout of the report it is always a good practice to check the spelling and grammar using the facilities provided by most word processors. Some common sources of confusion are as follows: the word 'data' is plural, not singular; different meanings of the homophones 'affect' and 'effect', 'complement' and 'compliment', 'discreet' and 'discrete', 'principal' and 'principle'; the abbreviation 'i.e.' means 'that is', and the abbreviation 'e.g.' means 'for example'.

It should be remembered that the University computing facilities are heavily used during the period when project reports are being prepared. Since computer crashes tend to occur at the most critical point in the preparation of a report students are expected to maintain back-up copies as standard procedure. To avoid any unforeseen delays students are strongly recommended to start preparation for project submission (last minute corrections, printing, etc.) well in advance of the of the submission deadline.

8. SUBMISSION OF THE PROJECT REPORT

The final project report has to be submitted on Moodle in pdf format prior to the published deadline.

Two printed copies of the report are required for the examination and will be retained by the University. Students also must have a third copy available for reference at the oral examination and for their own use afterwards. Each of the University copies should be submitted unbound, not punched, in a separate folder or envelope and must contain an Abstract. An extra copy of the Abstract will also be required, i.e. 3 copies of the abstract in all.

Two copies of the report, **together with an extra copy of the Abstract** plus any materials relevant to the project (e.g. DVDs, videos, code etc.) should be submitted **unbound** to the SEMS UG office by the published deadline for submission. A Project Submission Form (will be available on Moodle) must be completed and a copy retained by the student as proof of submission.

Project reports must not be submitted to the supervisor or to the Course Director for the course.

a. Project Submission Checklist

For project submission the following checklist should be used:

(a) An electronic version of the report uploaded onto Moodle in .PDF format.
(b) Two copies of the unbound (not punched) report in separate folders (clearly labelled with the name of the student, course and submission date).
(c) One separate copy of the Abstract in the supervisor folder.

b. Late Submission of Project Reports

Late submission of project report is a serious matter and in most cases projects submitted late will carry a penalty. There are significant penalties of late submission of the final report:

5% PENALTY ON FINAL MODULE MARK FOR SUBMISSION UP TO 1 HOUR LATE

10% PENALTY ON FINAL MODULE MARK FOR SUBMISSION 1 - 24 HOURS LATE

5% ADDITIONAL PENALTY FOR EACH ADDITIONAL 24 HOURS OF LATE SUBMISSION

For example:

- for submission 10 minutes late, the penalty would be 5%
- for submission 2 hours late, the penalty would be 10%
- for submission 1 day and 5 hours late, the overall penalty would be 10% + 10% = 20%

Late submission of the preliminary report or the poster carry a penalty of 5% for each 24 hours after the deadline.

In the event of a late submission due to extenuating circumstances, students are to submit an Extenuating Circumstances (EC) form to the SEMS UG office, providing proof (i.e. medical certificate, etc.) of the situation that has led to the late submission, following the usual School procedures.

Project supervisors, the Head of Department and the Director of Studies are unable to grant deadline extensions. Final approval for late submission is decided by the Extenuating Circumstances Panel.

9. Plagiarism

It should be noted that **Plagiarism in a final year project is a very serious offence and is likely to nullify any marks awarded and hence the award of a degree also. Plagiarism will lead to an Academic Misconduct panel.**

All Moodle submission are checked using the Turnitin software. The Preliminary report will give you an opportunity to see the level of similarity of your report to other submitted research papers or reports, which should help you avoid high similarity level for the final report. There are no penalties for high similarity levels at Preliminary report, but very high similarity level at the Final report stage will be severely penalised and will have a likely result in official Academic Misconduct and failure in the Project.

10. Final Project Oral Presentation Exam

All students are expected to make a formal presentation of their work at the end of the Project lasting 10-15 minutes followed by a 15 minutes question and answer session. The examination will take place in early June, after the May examinations. The examination schedule will be published three weeks prior to the examinations.

Please make sure you are available in the period 2-12 June 2017 for the Project examinations.

The examination normally takes place in the presence of the supervisor and the co-examiner. At the oral examination you will be expected to demonstrate your knowledge of the work undertaken and to defend the report submitted for assessment. You are also requested to have a copy of their report with you during the examination.

In presenting their work students are strongly recommended to make use of the available data projectors for PowerPoint (or other presentation making software) presentations. Although TV/Video/DVD players are provided in the class rooms, any other audio visual equipment needs to be obtained from the University Audio Visual Services (room E101, https://intranet.city.ac.uk/students/it/it.html). It is the responsibility of the student to make arrangements for this additional equipment well in advance of the presentation. Internet access is also available, but is is advisable to check the quality of the WiFi access in the examination room prior to the examination.

The oral examination session is chaired by the supervisor and should last no more than 40 minutes. However, the organisation of the oral may depend upon the specific project and is at the discretion of the supervisor and the co-examiner. Following, (or occasionally during), the presentation questions on the project report and presentation will be asked by the two examiners. These are normally led by the co-examiner but the more technical questions are likely to be asked by the supervisor. The aim of the questions is to ascertain the level of understanding and originality of the work presented and to clarify any points of misunderstanding. *Practical demonstrations are strongly encouraged* and can be made during the presentation or after the oral session – at the discretion of the supervisor and the co-examiner. It should be noted that for projects involving development and/or design of software, websites, etc., practical demonstrations of the outcome of work is almost always a requirement.

a. Marking Standards

The following is intended to provide guidance on the final mark awarded for the project in order to achieve uniform standard:

Unsatisfactory *(Mark Range 0-25%)*

Student needed constant direction and help to the extent that the supervisor essentially planned the work throughout. Practical and theoretical ability poor. Little motivation and interest. Negligible achievement. *Failed project*.

Poor *(Mark Range 26-39%)*

Student approaches project as an extended laboratory class. Literature survey extended little beyond the initial references given. Needed and expected considerable guidance in the planning and execution of work and to overcome problems. Competent at carrying out suggestions but unable to proceed unaided. *Failed project*.

Acceptable *(Mark Range 40-55%)*

Student showed some initiative in developing project and dealing with problems but needed some guidance in deciding way forward. Competently achieved the stated (or modified) aims of the project largely by his/her own efforts.

Good *(Mark Range 56-75%)*

Student had a good grasp of the problem and was able to plan his own way forward. Literature survey extended well beyond the initial references. Good use of information acquired in developing the project. Able to contribute ideas in overcoming problems. Quickly understands suggestions made by supervisor. Likely to have taken the project beyond the basic specification. Needed little supervision.

Outstanding *(Mark Range 75% and Above)*

Student included some original ideas in project development. Unlikely to be caught by unexpected problems but quite able to overcome them when they arise. Supervisor could expect to learn something from this student.

b. Failure in Project

Project mark is calculated using the marking scheme provided earlier in this Handbook. There is no pass mark for individual Project components, only for the final Project mark. All Project marks are moderated at the Special Project Moderation Board meeting. In the case of large discrepancies between marks given by examiners, the Project report is given to a member of staff who has not acted as supervisor or examiner for that student.

In the case overall Project mark is below 40% following the marking and moderation, the Project is considered a failed Project. The Project marks are sent to the main Assessment Board, which makes the decision for the student based on the students' results during the year. In the case the Assessment Board makes a decision that the student needs to resit the Project, a deadline is set (typically in mid August), and the student is required to work with the same supervisor to develop new Project results and new Project report. The resitting student is expected to continue working on the same Project topic, and can change topic only with a clear agreement with the supervisor.