Qassim University

College of Engineering

جامعة القصيم

كلية الهندسة

MSc Thesis Manual

Civil/ Electrical/ Mechanical/ Renewable Energy Engineering Programs

Approved by Quality Unit

Introduction

Qassim Engineering College (QEC) is proud to present a manual for the scientific thesis of its MSc Programs. This manual has been prepared with the guidance and review of the College Quality Assurance and Academic Accreditation Unit (QAAA). The contents were made to be in abidance with the new developments in the Kingdome of Saudi Arabia (KSA). The current manual is also prepared in accordance to the National Center of Academic Accreditation and Evaluation systems.

The manual is designed to allow the students to be fully aware of the requirements of registering the thesis, preparing the research proposal, preparing the thesis report, and what is expected from them regarding the evaluation of the thesis and the thesis defense. It also guides the staff members- as supervisors- to be fully aware of their responsibilities, tasks, way of evaluating the student theses, and how to link this to the program learning outcomes evaluation.

We ask God that this manual acts as a guide for our faculty, answers their academic quality quires and gives our faculty encouragement to be an effective part of raising quality in our academic activities.

An Opening

QEC is very proud of producing a manual for the scientific thesis of its MSc Programs. This manual has been prepared under full supervision of QEC QAAA Unit. The manual is designed to allow the students and faculty to be fully aware of their responsibilities, tasks and rights concerning the thesis. This manual will help in enhancing and ensuring high quality theses.

Table of Contents

1. Thesis Description and Particulars

MSc Thesis in QEC programs is at least a two-semester research-oriented course. This course is designed to provide students with the opportunity to conduct independent, original research in a specialized area of mechanical engineering. Further, this course emphasizes the development of a deep understanding of advanced engineering concepts, research methodologies, and the ability to apply these to real-world problems. A supervisor is assigned to each MSc student who will guide the student's research tasks including research paper, progress report, thesis editing/reviewing, and thesis defense.

This guide gives complete and detailed information about the thesis of QEC MSc programs regarding the registration requirements, its PLOs, preparation, and evaluation, in addition to the quality control of the thesis.

1.1 Registration Requirements

The student is eligible to register the thesis if he satisfies the following condition:

1. Finishing at least 50% of the courses.
2. Attaining a GPA of the studied courses not less than very good (3.75 out of 5)

The followings are necessary for starting the thesis work.

1. Approving the research project by the Prog. /Dept. Council
2. Having a supervisor which is assigned to the student through the Prog. /Dept. Council

1.2 Supervision Mechanism

The criteria for assigning the supervisors are as follows:

1. Only senior specialized staff members are assigned as supervisors of the MSc theses taking into account the QU regulations and rules.
2. The program takes into account the distribution of supervision of scientific theses equally among the staff members of who meet the supervision requirements.
3. The scientific program/department determines an academic advisor for the student at the beginning of his study.
4. The academic advisor should be the main scientific supervisor of the student, unless this violates the upper limit of thesis supervised by a faculty member.
5. When choosing an advisor or scientific supervisor, the minor specialization is an essential factor.
6. It is permissible to use professors from outside the college for supervision or assistance in supervision after the approval of the scientific department or program

1.3 Proposal Preparation

The procedures and regulations of research proposal for MSc thesis are as follow:

1. The student should finish at least one semester before submitting his research proposal.
2. The student submits his research proposal to the Program MSc Scientific Committee through his academic advisor (supervisor) during the regular period of the program.
3. The student should present his research proposal to the evaluators.

4. The proposal should be evaluated by at least 3 specialized evaluators.
5. The proposal must score at least 75% by the evaluators, according to the evaluation form of the program.
6. The scientific committee studies and evaluates the proposal, then issues a recommendation for the Head of the Department.

2. Thesis Preparation

- The thesis is a significant component of the MSc degree. It has two parts: investigating and understanding a topic, and producing a coherent piece of text that describes the results of the investigation. Both parts are typically new for students, and highly instructive.
- In studying the topic, the student must work independently, understand texts that may be difficult or terse, and possibly solve unfamiliar problems that are not pre-chewed like classroom or textbook exercises.
- Writing up is even harder. The results of the investigation have to be explained clearly and informatively, in an appropriate tone and style, and in proper form. Writing well is hard work, and an activity that must be learned. The MSc thesis provides such a learning opportunity.

2.1 The Investigation Stage

The thesis project typically relates to the research interests of the supervisor. Common types of projects are: (a) a survey of a specific topic; (b) understanding and explaining a published, or about-to-be-published, research result; (c) writing a computer program and explaining the results of running it.

Sometimes, the project offers the student the opportunity for original research, for example proving a mathematical conjecture related to a result studied as in (b). Normally, an MSc project does not require the student to produce original research, because the outcome is unknown and may be difficult to obtain. On the other hand, this is what research is about, so a good student may find this an interesting challenge. The thesis topic is always set so that a student can get a distinction even without any original research contribution, provided the thesis is well written

Solving the problems of the MSc project is only the first half of the work. The results of the investigation are to be written down in the MSc thesis. In writing a thesis, the student no longer just reproduces, he produces. It is the product that counts, not the effort. The writing of the thesis will be judged against a number of criteria, and the thesis should meet the following standards:

(a) Proper form. The thesis has to follow a standard format for scientific communications. It has to have a title, introduction, sections describing the results, and a bibliography. It should be written in correct English and follow conventions of citation and of mathematical writing. Use English UK spelling or American spelling.

(b) Accuracy. What is written must be logically coherent and correct. It must be clear which contributions are the student own and which are taken from other sources. Negative results can and should also be reported; these can be parts of the investigation that are inconclusive, for example a conjecture that remains open.

(c) Readability. The text should be a readable narrative, hopefully interesting, and above all clear. Assume a consistent level of what the reader already knows. The student can assume that the reader has a general background, but the student cannot assume that the reader is familiar with the papers

that the student writes about. Also, it is not enough that an expert in the field can read "between the lines" that the student has understood the topic. A non-expert has to be able to make sense of what the student writes as well. The student should make himself clear is an important skill that he learns when writing the thesis. An even more basic requirement than the accuracy stated in (b) is that the student must not present someone else's work as his own.

The student may find a text somewhere that perfectly describes part of his subject. If the student uses that source without citing it, he commits plagiarism and violates basic ethics of scholarship, because he misleads the reader about his own contribution. Plagiarism is a severe offence.

2.2 Studying and Researching Stage

The supervisor is likely to provide at least one research paper as an introduction to the topic of the student thesis. The first step is to read and understand this paper. Research papers are more intensive than textbooks. When the student reads the paper, understands the simple things first. Creates his own examples. The student will also have to identify certain standard results that may be taken for granted in the paper, for example "Farkas' Lemma" in a paper on Linear Programming, even though this is not explicitly stated, and with which he may not be familiar. If the student suspects that there is a standard result that he should know, he should look it up, with Google, Wikipedia or in a textbook or handbook. The supervisor will also be able to tell him. He can then proceed to the more difficult parts. In the course of studying, the student may have to decide that he has to limit his thesis topic further in order to write on it successfully. The student should also get a feeling for the context of the research that he investigates, by looking at related work.

Finding and selecting references is an essential part of the scholarship that goes into the thesis. Searching and understanding related papers is often part of the project, in particular for a thesis that is a study of the literature. Related papers are found, first of all, by following the references in the papers that he currently studies, and their references. Related papers have often overlapping reference lists, which give the student a feeling for the field and its important papers. If the student explores the literature seriously, he will soon encounter papers that turn out to be irrelevant for his topic. The student can safely delimit his subject if, in this way, he has looked at more papers than he cites. In addition to following citations from one paper to another, the student may look at other works by the same author. For recent work, that author may have a web page. Older papers can be found in the database of the Research Topic Reviews that gives summaries and possibly evaluations of papers; these are also worth checking for the papers that the student already knows. Citations that go forwards in time can also be found with Research Topic Reviews or with a citation index. He types in an important paper that is central to his topic and finds later references to that paper, which may be possibly interesting. Also, the student should use Google or Google Scholar with various combinations of keywords about the topic. One purpose of the search may be to establish that there is not much more to the thesis subject than the student has found already.

3. Communicating with the Supervisor

(a) The student has to submit an Initial Report and Interim Report. The purpose of these reports is to ensure that the student understands the problem the student is working on and do not get stuck on technical problems.

(b) Research papers that the student study is likely to be much more difficult than textbooks. Identify what the student does and does not understand. It is important for the student not to get stuck at a single sentence or paragraph of the paper that the student studies. The student should read on, with partial understanding on what the paper is about, then come back to the stumbling blocks. The student may still not understand them. Then, it is advisable to meet the supervisor to help him in this regard. The supervisor may not have a direct answer, but may be able to find it out with you.

(c) Early on, the student should try to write one or two sample chapters. These will test his writing abilities. One sample chapter can be a draft introduction that describes the problem and how the student plan to address it. The student will need such a piece of text anyhow as a starting point for an improved introduction. Moreover, defining the problem gives the student a chance to clarify possible misunderstandings about the topic. A second sample chapter should describe an early part of your own study. The student should select a small part of the project, and understand and describe it. This also gets the student started, both on working independently and on writing it up, and on talking to your supervisor. As the project progresses, your supervisor may be willing to look at a sample draft of the thesis. The student should appreciate the supervisor's time as a very limited resource. The supervisor is not obliged to read full thesis drafts in the first place, but does this to help the student. The student should pay attention to the following:

(d) The draft should be free of obvious errors, in particular in punctuation, grammar, or citations, otherwise the student makes a bad first impression, and the student distracts his supervisor's attention from the contents to trivial formal aspects. The student should get into the habit of writing English texts (including the emails) without errors.

(e) The student should listen carefully to comments on his draft. The student may get his draft back with a general comment, for example to be "more factual". The student should clarify if this means that the general tone of the thesis should change. If the student get specific comments, he should follow them, but note that they are often only examples of what needs to be improved. The student should understand the spirit of these comments and change the text at other places where that kind of problem occurs.

(f) The student should plan ahead. He has to find out when his supervisor is away. If the student gives his supervisor a draft of the thesis a week before it is due for submission, the student will at best get suggestions that he can implement in a few days. If the student invests enough time early on in his MSc project, the student should not encounter severe problems at this late stage.

4. Thesis Principles and Ethics

According to the rules of ethics imposed by QU, the followings should be adhered to:

1. Focus on the importance of honesty in all research steps including: gathering information, recording results, the method used, writing and publishing the research.
2. The researcher should avoid bias to any point of view, or adopt a prior result in the steps of research such as, analysis of results, data, writing the research plan, review of views, and previous research.
3. Commitment to accuracy, and seriousness in all aspects of research, and keep records of the steps and results of the search.
4. Sharing ideas, data and devices, as well as providing advice and assistance to those who need colleagues, and accept criticism, and suggestions.
5. Appreciate and respect the opinions and suggestions of the participants in the research, as well as the protection of minors, or unaware that may be covered or dealt with by the research.
6. Respect for intellectual property rights: such as patents, copyrights and other types of intellectual property.
7. Protect the privacy of individuals and information in all aspects of research.
8. Treating others with respect for and observance of their rights, giving each person his destiny, and his appropriate status.

5. Procedures and Controls for Scientific Research in the University

QU has the following procedures and rules which should be followed by the researchers **(Link):**

1. Research topics have a congenital dimension, but there are some research trends in which the moral aspect has a special place: research that is concerned with the human and health aspects; research conducted using experimental animals; and research that has social and political sensitivity.
2. The researcher is responsible for obtaining the prior approval of all the subject of the research, and the researcher should clarify to the participants in the research.
3. If the participants in the research are unaware of the nature of the research, or the value of their participation in it, for example, children, a written consent must be obtained from a parent or guardian.
4. If the participants' knowledge of the nature of the research will affect the results, they should at least mention the research of those participants.
5. It is recommended that the researcher consults with experts in the research subject, or the opinion of one of his colleagues when there is a need, especially in research related to some disciplines.
6. The researcher should clarify the nature of the research to the participants, and obtain their consent to participate in it, including the method of writing the names of the participants and how they will be arranged with the definition of their workplace.

7. Research participants should be made aware of the importance of not publishing any data on the results, the privacy of the research, as well as not disclosing or using the information and results of the research until it is completed and published.

6. Student Work Follow up by the Supervisor

The supervisors are following up the student work through the following activities:

1. Scheduled meetings with the supervisor

2. Reports and drafts revision.

3. Revision of the thesis report draft

4. Official reports which are submitted electronically by the supervisor every semester to the Post-Graduate Deanship about the student performance and progress.

3. Regular seminars held by the student under the supervision of the supervisor.

7. Structure and Format of the Thesis

The Thesis should include a title, introduction, literature review, core section, results and analysis, conclusion and bibliography. The main sections of the thesis text should be of roughly equal size. Sections that are reasonably balanced are easier to read. The student may use subsections if they help locate a topic and make the table of contents more informative

The Title

The title should be clear, informative and have no infamous abbreviations. It should agree with that approved in the research proposal,

The Introduction

The introduction is the most important section of the thesis. Whenever the student writes a longer technical document, most readers never go beyond the introduction. If the introduction is good, they may feel encouraged to read on. The introduction is also the hardest part to write, and has to be rewritten several times. It therefore important that the student learns how to write a good introduction. Most of the following hints apply to writing in general. The introduction describes the area in which the student is working, gives the basic definition and terminology, and sets out the fundamental results. If the thesis contains a proof of a result, which may be the student own work or someone else's, then the student should give the statement of the result in the introduction and explain its significance. As a good rule for structuring any argument, in particular the introduction, it is useful to answer the sequence of questions what – why – how. Always state what the student are talking about first before justifying it or diving into details. The "what" part of the introduction summarizes the contents of the thesis. Ideally, the student should be as informative as possible. Obviously the student cannot say everything at once, so the student may have to simplify. The student may choose to tell a "white lie", but the student should try not to make

statements that are wrong; for instance, the student may by add a qualifier like “under certain reasonable assumptions”. The introduction should always cite and, if possible, summarizes relevant work done by others. This puts the work of the thesis in context and allows the reader to judge the thesis’s contribution. If the student can do so briefly, the student may give a history of his subject first in order to explain what the current work is about. In that way, the student simultaneously takes care of the “what” and the “why” part. Usually, the “what” part comes first, the “why” comes at a suitable time later. The “how” part should summarize the methods used in the thesis, and possibly give further details. If the student present original research, it is good to explain the main ideas in the introduction, and make them sound as un-mysterious as possible. If this is done well in the introduction, the reader will be curious to read more about them. The student should make it clear that he is the first person to have found something (if that is correct), but be careful and modest about it. At any rate, make it clear in the introduction what the student own contributions are, which may be original research or in terms of exposition. Do not be shy to state contributions that are small. The final paragraph of the introduction is typically a brief list of the sections of the thesis and their contents. The following is a list of common mistakes in an introduction and how to avoid them. (a) Exaggerated claims, for example “differential games are one of the most important tools of economics”. This may be the student impression after studying differential games, but it sounds naive. The student should adopt a neutral tone, and remain careful and factual. The subject of the thesis does not have to be declared as very important. (b) Assuming too much knowledge from the reader. The student has immersed himself in the topic for several months, but the reader has not. The student should be aware of that, and explain and introduce his topic in a comprehensible way. (c) An introduction that is an unclear medley of exposition, history of the subject, and a repetition of what others have done. A good way out of this is to deal with these aspects separately, in particular, to postpone the exposition to a main section. To state early what the student does in the thesis. To suppose that the thesis is mostly on a topic covered in paper X. The student may choose similar opening sentences as paper X. However, when paper X says “We solve this problem as follows”, do not say “we”, but say instead “This problem is solved in [X] as follows . . .” and then state how the student will explain the results of paper X in a later section of your thesis. In the writing process, the introduction can normally be finished only when the main text is complete because only then does the student know its contents and structure. For the thesis, the student should try nevertheless to produce a draft introduction early on. The student will get practice in writing, and gain valuable feedback on his view of the topic from the supervisor.

The Bibliography and Citing References

Citing references is part of any scholarly writing. In the thesis, the student has to demonstrate that the he can cite properly. This section of the guide explains what and how the student should cite.

Essential citations

It is mandatory that the student cite your sources; otherwise, the student plagiarizes. The student must not present something that the student obtained from someone else as new. The student also has to avoid making that impression inadvertently. If the student uses someone else’s wording verbatim, it is useful to say so explicitly, as in “The following definition is taken verbatim from [X].” If the student bases an entire section of your thesis on some other work, the student can

explain this once at the beginning of your section. The citation is part of the story that the student tells. It is not enough to merely include the citation in the bibliography, because then it is not clear where the student has used it. Any cited work must be referred to in the main text. On the other hand, the student only has to cite those works that are relevant for your work, not everything that the student has read.

Helpful citations

Some citations help the reader to understand what the student is doing. For example, if the student states a new theorem that is similar to a theorem in a paper (which the student may have already cited earlier) but which is different, say so explicitly. Otherwise, the reader may think that the student has overlooked the similarity, or may not appreciate the difference. Another type of citation is of material that the student assumes is known, or that the student does not want to spend too much time on, where the reader can obtain further details. Here, it is good to cite standard reference books, rather than, for example, lecture notes from your home university, because this shows that the student know and can judge your field. The student can assume certain mathematical basics (in particular of linear algebra and calculus) without citing them. If the student is in doubt, he should ask his supervisor.

Know what the student cites

Use of second-hand citations from other papers without obtaining and checking the cited works is not recommended; the student can often get them online and do not even have to print them. First of all, the reference details (for example volume or page numbers) may be wrong and then the student copy a mistake. In rare cases where the student cannot get easily hold of a classic reference, at least he should double-check the bibliographic details. Second, there are references with the same title, for example a technical report and later publication which nevertheless differ, which the student can only find out by getting hold of the reference itself. Third, even a brief look at the cited work tells the student if it is relevant for your work. It may also be more informative than the secondary source where the student got it from. An original research paper can be surprisingly readable because the author had to get something new across and tried to explain it well; it is worth having a look. If the student uses a paper that does not have bibliographic details, for example a printout that the supervisor gave the student for his thesis preparation, the student should find out how it can be obtained, and add information that may be missing, like a date. An internet search with the title or a sentence from the abstract will show if it is available online.

Bibliographic details

The publications that the student cites in his thesis are listed at the end in the bibliography, often entitled “references”. They should be listed alphabetically by author so that an entry is found quickly.

The bibliography is one of the first things a reader looks at. It places your work in context. An expert reader will recognize familiar references quickly, and also notice omissions. A non-expert reader may appreciate the bibliography as a way to learn more about the topic. A good bibliography indicates that the student is in command of your subject. For all reasons named so far, the

bibliography provides the student with an excellent opportunity to make a good first impression. The student should therefore care about the formal details, and about what the student cites. Getting the formal details right sounds boring, but the student has to do that only once. All bibliographic entries should be correct, complete, and consistent.

Citation Styles

The student has to decide on how he cites his references in the text, and uses that style consistently. There are essentially two possibilities, namely either by author and year, often called "Harvard style", or by number in square brackets. An example of citing by author and publication year is Fortnow and Kimmel (1994), corresponding to the numbered citation [--] that this guide uses. Citing author and year in the text is informative, because a reader familiar with that reference does not even have to look at the bibliography. Moreover, the student may often want to mention the authors anyway. When the student cites by author and year, the student does not have to number the references in his bibliography. The only problem with citing author and year is that this becomes long when a paper is cited many times. This may be minimized in a single sentence or paragraph by arranging the citations suitably. If the paper talks about a reference many times, an acceptable way out of this may be to say "Fortnow and Kimmel (1994), henceforth abbreviated as [FK]", because presumably only very few citations will recur that often.

The "et al." abbreviation is used for a paper with more than three authors. Moreover, the student can also use it when he cites a three-author paper a second time. With author and year citations, put the year parentheses even when the citation itself is in parentheses, as when the student says (see Halmos (1970)). Reference to specific page numbers can be given as in Halmos (1970, p. 125). An example of multiple citations by the same authors is Fortnow and Kimmel (1994; 1998). Alternatively, the student can use numbered citations as in this guide, which are shorter. The references in the bibliography should always be sorted alphabetically, not in their order of citation in the main text, to keep the reference list informative.

8. Academic and administrative procedures for the approval of the thesis

1. After the student has completed preparation of the thesis, the supervisor submits a report to the Head of MSc ME Program, attached with a copy of the thesis, in preparation for completing the discussion procedures.
2. The report should contain the following elements:
    - Title of thesis, its total chapters and the number of pages.
    - Extent of compliance with the approved proposal.
    - Its Validity for discussion
3. Based on the supervisor's report on the completion of the thesis and its validity for discussion, the student's regular period and the period of supervision of the thesis expire.
4. The MSc ME Program Council proposes the members of the discussion committee, and one or two reserve members can be proposed.
5. The student must publish a scientific paper from the thesis as one of the graduation requirements in any scientific specialized journal or in a local/international conference.

6. The discussion committee is not formed before the publication of scientific paper or getting online final acceptance.
7. QEC Council approves the formation of the discussion committee.
8. The discussion will be held within three months (maximum) from the date of the formation of the discussion committee.
9. The Post Graduate Deanship (PGD) is provided with a copy of the formation of the discussion committee.
10. The discussion committee makes its decisions with the approval of at least two thirds of its members.
11. The supervisor should submit a letter stating that the research published or accepted for publication from the scientific thesis of the student.
12. During one week from the date of the discussion, the discussion committee prepares a report signed by all its members to be submitted to the chairman of MSc ME Program.
13. The submitted report in item 12 will have one of the following recommendations:
    - **(a)** Acceptance of the thesis and recommendation of the degree awardee.
    - **(b)** Acceptance of the scientific thesis with some amendments, without discussing it once again. One of the members of the discussion Committee is authorized to recommend the granting of the degree after confirming these amendments within a period not exceeding three months from the date of discussion. The college council may make an exception from that not exceeding six months from the date of discussion.
    - **(c)** Completing the shortcomings in the thesis, the committee returns to discuss it during a period determined by the college council based on the recommendation of the MSc ME Council within one year of date the first discussion.
    - **(d)** Disapproval of the thesis.
14. Each member of the discussion committee has the right to submit a detailed report of his own reservations to the MSc ME chairman within no more than a week from the date of the discussion. This report will be attached with the report of the discussion committee and submitted to the dean of the college.

9. Thesis Evaluation

9.1 Thesis Discussion (Defense)

The thesis project ends by the final defense (discussion meeting) in which the student presents his work and findings in front of a specialized discussion committee.

Discussion Committee Formulation Rules

The detailed procedures to guarantee fairness, objectivity and credibility of research evaluation and discussion of thesis:

1. The time between acceptance of the research proposal and submitting of the thesis should not exceed 2 semesters.

2. Based on the recommendations of MSc the Program and QEC Councils, Defense Committee is approved by the Council of the PGD.
3. The Master's thesis Defense Committee must fulfill certain requirements as follows:
   a. *It must comprise an odd number of members, chaired by the thesis advisor.*
   b. *The Committee must comprise at least three members.*
   c. *The advisor and co-advisor if any should not constitute a majority in the Committee.*
   d. *The Committee members should meet the conditions of the thesis supervision.*
   e. *At least one member of the Committee must be a professor or an associate professor.*
   f. *Decisions of the Committee should be based on a majority vote of at least two thirds of the total number of members.*

9.2 Thesis Evaluation Forms

The thesis is evaluated using the official template proposed by QU (Appendix A). This template has been modified with adding detailed sub-items to make it easy to link the evaluation to the PLOs. The detailed items for evaluating the thesis are given in Appendix B.

9.3 Evaluation Fairness, objectivity and credibility

The detailed procedures to guarantee fairness, objectivity and credibility of research evaluation and discussion of thesis:

4. The time between acceptance of the research proposal and submitting of the thesis should not exceed 2 semesters.
5. Based on the recommendations of Program/Department Council and QEC Councils, Defense Committee is approved by the Council of the PGD.
6. The Master's thesis Defense Committee must fulfill certain requirements as follows:
   a. It must comprise an odd number of members, chaired by the thesis advisor.
   b. The Committee must comprise at least three members.
   c. The advisor and co-advisor if any should not constitute a majority in the Committee.
   d. The Committee members should meet the conditions of the thesis supervision.
   e. At least one member of the Committee must be a professor or an associate professor.
   f. Decisions of the Committee should be based on a majority vote of at least two thirds of the total number of members.
7. If, for any reason, the thesis reason thesis advisor cannot participate in the defense committee, due to his death or his service to QU is discontinued, or his presence outside the country in task for a long time, the Program/Department Council should suggest a replacement who should be approved by QEC council and council of the PGD.
8. A report is prepared and signed by all members of the thesis committee. The report must be submitted to the HoD within one week of the date of the public defense.
9. The report must include one of the following recommendations:
   a. The thesis is accepted and recommended for the award of the degree.
   b. The thesis is accepted with some modifications, without a re-defense being necessary. A member of the committee is delegated to recommend awarding of the degree after ensuring that the required
   c. Modifications are implemented within three months from the date of the first public defense. This period can be waived by the QU Council.
   d. Further work is recommended on the thesis, followed by a second defense within a certain period of time to be decided by the Council of the PGD, based on the

recommendations of the Program/Department Council. This period must not exceed one year from the date of the first defense.

e. The thesis is rejected.

10. Each committee member has the right to submit his own comments or reservations in a separate report both to the HoD and the Dean of PGD, within two weeks of the date of the defense.
11. The HoD must submit the report of the Thesis Committee to the Dean of PGD not later than three weeks after the date of the defense.
12. The Dean of PGD must submit the recommendations to award the degree to the QU Council for approval.

10. Thesis Quality Control

10.1 Quality Control Procedures

The thesis quality is controlled through:

a) Ensuring the quality of the research proposal at the beginning. This is done through the procedures followed when preparing the proposal (see Sec. 1.3)
b) Checking the quality of the thesis construction (see Sec. 1.4)
c) Rigorous check of the thesis scientific contents. This is guaranteed through having an investigation committee formed according to rigorous regulation to avoid courtesy. Also, the thesis scientific quality is ensured by having extracted publications from its output.

10.2 Improvement actions

Feedback is obtained through:

- Graduate Student surveys
- Theses Supervisors
- MSc recent alumni

11. Thesis Linkage to the PLOs

The QAAA unit in cooperation with the MSc Programs' Committees has proposed the following linkage of the Thesis course to the MSc PLOs.

	MSc PLOs The ME graduate's student should:	Linkage Level
Knowledge and Understanding	K1- Reveal deep and specialized body of knowledge and understanding covering theories, principles, and concepts in the field of mechanical engineering.	M
	K2- Demonstrate critical knowledge and understanding of processes, materials, techniques, practices, conventions, and/or terminology relevant to mechanical engineering field.	M
	K3- Express advanced knowledge and understanding of recent development in the field of mechanical engineering.	M
	K4- Exhibit excellent knowledge and understanding of a range of established and specialized research and/or inquiry techniques in the field of mechanical engineering.	M
Cognitive Skills	S1- Apply specialized theories, principles and concepts in advanced frameworks in the field of mechanical engineering.	M
	S2- Solve problems in complex and advanced perspectives in the field of mechanical engineering.	M
	S3- Critically assess, review, and reflect on key concepts, principles, and theories; and provide creative solutions to current issues and problems in composite and advanced contexts in the field of mechanical engineering.	M
	S4- Carry out advanced research or professional projects using specialized research and inquiry methodologies in the fields of mechanical design, manufacturing, dynamic control, thermofluids, and other related fields.	M
Practical and Physical Skills	S5- Utilize and apply tools, materials, processes and techniques that are advanced and specialized to deal with complex and advanced practical activities in the field of mechanical engineering.	P
	S6- Carry out multifaceted and advanced practical tasks and procedures in specialized areas related to mechanical design, manufacturing, dynamic control, thermos-fluids, and other related engineering fields.	P
Communication and ICT skills	S7- Communicate in various forms to disseminate knowledge, skills, research results, and innovations related to mechanical engineering field to specialist and non-specialist audiences.	M
	S8- Process data and information quantitatively and/or qualitatively in complex and advanced contexts suitable for mechanical engineering field.	M

	S9- Select, use, and adapt advanced digital technological and ICT tools and applications to process and analyze a variety of data and information sets to support and advance leading research and/or projects related to mechanical engineering field.	M
Values, Autonomy and Responsibility	V1- Demonstrate integrity and professional and academic values when dealing with various issues.	M
	V2- Initiate professional planning for learning and/or work, professional development, monitor learning and performance, and participate in academic and/or professional strategic decisions, with high autonomy.	M
	V3- Effectively manage tasks and activities in the specialty of mechanical engineering and related disciplines with complete independence.	M
	V4- Effectively collaborate and participate in research or professional projects or groups, undertake leadership roles, and take high responsibility of the work.	M
	V5- Contribute to the development of the quality level of community life.	M

12. Appendices

Appendix A: QU Proposed Thesis Evaluation Template

Kingdom of Saudi Arabia
Ministry of Education
Qassim University
Deanship of Graduate Studies

المملكة العربية السعودية
وزارة التعليم
جامعة القصيم
عمادة الدراسات العليا

تقرير فردي للمناقش الدكتور/ .....

أولاً: بيانات الطالب/الطالبة:

اسم الطالب/الطالبة:		الرقم الجامعي:	
☐	☐	الدرجة:	ماجستير
	دكتوراه		
الكلية:		القسم:	

عنوان الرسالة (بالعربية والإنجليزية):

.....
.....
.....
.....
.....

ثانياً: بيانات المناقش:

الاسم:	الدرجة العلمية: .....
الجامعة:	الكلية: .....
القسم:	التخصص الدقيق: .....

ثالثاً: معلومات خاصة بالرسالة:

م	المعيار	الدرجة (١٠)
١	استيفاء الرسالة للخلفية العلمية لموضوع البحث.	
٢	- الجدة والأصالة (لرسائل الماجستير). - الأصالة والابتكار والإسهام الفاعل في إنماء المعرفة (لرسائل الدكتوراه).	
٣	الموضوعية في الرسالة.	
٤	الالتزام بالمنهجية العلمية.	
٥	التحليل العلمي في الرسالة.	
٦	نتائج وتوصيات الرسالة.	
٧	مصادر ومراجع الرسالة وتنوعها.	
٨	لغة الرسالة وإخراجها: أ- أسلوب الكتابة وسلامة اللغة. ب-الإخراج الفني.	
٩	الاضافة العلمية للرسالة.	
١٠	عرض الطالب/الطالبة أثناء المناقشة.	
	المجموع الكلي (١٠٠ درجة)	

رابعاً :**التوصية بطباعة ونشر الرسالة**:

☐ **أوصي بطباعة ونشر الرسالة (يذكر مبررات التوصية)***.

.....
..
.....
..
.....
..
.....
..

خامساً : **ملاحظات المناقش (ان وجدت)**:

.....
..
.....
..
.....
..
.....
..
.....
..
.....
..
.....
..
.....
..
.....
..

اسم المناقش:

.....

التوقيع:

.....

Appendix B: Detailed Thesis Evaluation Items

م	المعيار	المخرجات المقاسة	الدرجة
١	استيفاء الرسالة للخلفية العلمية لموضوع البحث:		
	١,١ معرفة الطالب العميقة بالمعارف المتخصصة المتعلقة بموضوع الرسالة ومدى إدراجها في تقرير الرسالة K1	K1	2.5
	٢,١ المعرفة والفهم الدقيق للعمليات والإجراءات والمواد والتقنيات والممارسات .... في مجال الرسالة K2	K2	2.5
	٣,١ المعرفة والفهم المتقدم للتطورات الحديثة في مجالات تخصص الرسالة K3	K3	2.5
	٤,١ معرفة وفهم مجموعة من الأساليب المتخصصة في الاستقصاء و/أو البحث في مجال تخصص الرسالة K4	K4	2.5
٢	الجدة والأصالة (لرسائل الماجستير):	K3	10

	١,٢ المعرفة والفهم المتقدم للتطورات الحديثة في مجالات تخصص الرسالة K3		
٣	الموضوعية في الرسالة: ٣,١ التزام الموضوعية والحياد (subjective and neutral) V1	V1	10

٤	الالتزام بالمنهجية العلمية: اتباع خطوات محددة ومنظمة لدراسة موضوع الرسالة بما يشمل: ١,٤ تطبيق النظريات والمبادئ والمفاهيم المنخصصة S1 ٢,٤ حل المشكلات الهندسية في سياقات معقدة S2 ٣,٤ تقويم المفاهيم والمبادئ والنظريات العلمية والهندسية وتقديم الحلول الإبداعية للمشاكل والتطبيقات الهندسية S3 ٤,٤ اجراء بحوث متقدمة باستخدام أساليب متخصصة للبحث والاستقصاء في موضوع الرسالة S4	S1–Cog, S2–Cog, S3–Cog, S4–Cog	2.5 2.5 2.5 2.5
٥	التحليل العلمي في الرسالة.:		

	١,٥ تطبيق النظريات والمبادئ في سياقات متقدمة ؟؟؟؟ S1 ٢,٥ استخدام الطرق الكمية و/أو الكيفية لمعالجة البيانات والمعلومات S8 ٣,٥ اختيار أدوات وتطبيقات التقنية الرقمية وتقنية المعلومات والاتصال لمعلجة وتحليل البيانات والمعلومات S9	S1–Cog S8–Com, S9–Com	4 3 3
٦	نتائج وتوصيات الرسالة: ١,٦ تقويم المفاهيم والمبادئ والنظريات العلمية والهندسية وتقديم الحلول الإبداعية للمشاكل والتطبيقات الهندسية S3 ٢,٦ المساهمة في تعزيز جودة الحياة للمجتمع. V5	S3–Cog, V5	6 4
٧	مصادر ومراجع الرسالة وتنوعها: ١,٧ معرفة وفهم مجموعة من الأساليب المتخصصة في الاستقصاء و/أو البحث في مجال تخصص الرسالة K4	K4	10

٨	لغة الرسالة وإخراجها: أ– أسلوب الكتابة وسلامة اللغة. S7 ب–الإخراج الفني. S8	S7–Com, S8–Com	5 5

٩	الاضافة العلمية للرسالة: ١,٩ تقويم المفاهيم والمبادئ والنظريات العلمية والهندسية وتقديم الحلول الإبداعية للمشاكل والتطبيقات الهندسية S3 ٢,٩ أداء مجموعة من المهام والإجراءات العملية والاختبارات المبتكرة المرتبطة بمجال الرسالة S6 ٣,٩ المساهمة في تعزيز جودة الحياة للمجتمع V5	S3–Cog, S6–Phys, V5	4 4 2
١٠	عرض الطالب/الطالبة أثناء المناقشة: ١,١٠ تمكن الطالب من عرض الرسالة بتوافق عصبي عضلي S5 ٢,١٠ القدرة على الإقناع والتأثير وإيصال المعلومات S7 ٣,١٠ إظهار أن الطالب خطط ونفذ لاكتساب المعلومات باستقلالية V2 ٤,١٠ إظهار أن جديد الرسالة تم بعمل وجهد مستقل من الطالب V3	S5–Phys S7–Com V2 V3	2 3 2 3
	المجموع الكلي (١٠٠ درجة)		