Graduation Project Handbook

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1. Introduction

In a world which depends on information more than any time before, Information Technology (IT) plays a key role for the development of communities. Nowadays, IT is considered as an important pillar of economic development and many countries have looked at information as a valuable resource and invested heavily on information-based economy. The Kingdom of Saudi Arabia initiated a strategic plan for economic development which requires a large number of highly qualified professionals in every area of fast evolving information technology. In order to meet the growing demand of IT professionals in the kingdom, the College of Computer Sciences and Information Technology (CCSIT) was established in King Faisal University in 2003. The college currently offers three undergraduate programs in Computer Science (CS), Computer Information Systems (CIS) and Computer Networking (CN); the former two programs are accredited by ABET\(^1\).

To ensure that graduates are able to successfully apply the knowledge they have acquired throughout their undergraduate study - as per IEEE\(^2\)/ACM\(^3\) and ABET guidelines - all students in undergraduate programs must be involved in one capstone project. Such a project (hereafter, Graduation Project) is pursued over two consecutive semesters by a group of students and is supervised by a faculty member in the college. Graduation project starts with **Project Proposal** and is followed by **Project Implementation**.

In graduation projects, students are expected to apply, demonstrate and integrate comprehensive knowledge acquired across various undergraduate courses. The successful completion of graduation project is an indication of the students’ preparedness to pursue a professional career. At the same time, the variety and quality of graduation projects in the college certainly reflect the academic profile and achievement of CCSIT. Since the college currently offers three different

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\(^1\) Accreditation Board for Engineering and Technology  
\(^2\) Institute of Electrical and Electronics Engineering  
\(^3\) Association for Computing Machinery
undergraduate programs, a variety of innovative project topics and ideas can be pursued as graduation project in line with the respective program objectives.

The college appoints a Graduation Project Committee (GPC), with representatives from different departments, to act as a facilitator of graduation projects. The committee aims to facilitate variety of innovative, multidisciplinary and industry-sponsored graduation projects by encouraging wider participation of stakeholders and ensuring quality of projects.

This document is organized as follows: Section 2 gives a general overview about the management, execution and evaluation of graduation projects. Section 3 is dedicated to explain the roles of different stakeholders who are involved in different aspects of graduation projects. Sufficient and necessary criteria for the acceptance of a graduation project’s topic and pre-registration process are explained in Section 4. The process of bi-weekly meeting management and reporting is explained in Section 5. Section Error! Reference source not found. reviews the process of evaluation and grading of graduation projects. Section 7 is dedicated to the structure and contents of graduation project report and presentation. The milestones are explained in Section 8. Conclusions are given in Section 9.

2. Graduation Project Roadmap

As stated earlier, graduation projects consist of two courses, namely Project Proposal in 7th semester and Project Implementation in 8th semester. Prospective students must pre-register themselves at the end of 6th semester of study, which will allow them to start their project right from the beginning of the 7th semester. The pre-registration process is facilitated by Graduation Project Coordinators (hereafter, GP coordinator) who are appointed by each department.

Project proposal has three milestones and project implementation has two milestones, as shown in Fig.1.
The objective of setting these milestones is to allow guidance and progressive evaluation of the students by the committee members. Throughout these milestones, the committee members will provide necessary feedback to the students in order to prepare a feasible and comprehensive project proposal and to ensure a successful project implementation.

In principle, milestone 1 would ensure the students’ understanding of the problem and project scope and ensure their preparedness to carry on the project under the guidance of the supervisor. At milestone 2, the students are expected to show reasonable progress by demonstrating their ability to apply knowledge of computing and mathematics and by defining the computing requirements appropriate for the proposed solution. By milestone 3, students should be able to show their competency in analyzing the problem at hand and in designing a computer-based solution to meet the requirements of the project. After successfully defending the project, the students will proceed with the project implementation. At milestone 4, students are expected to make significant progress and show their ability to implement and evaluate a computer-based solution by using appropriate tools and techniques. The overall achievement of the project is assessed at milestone 5. Students are expected to show their awareness about professional, ethical, legal, security and social issues and responsibilities throughout the graduation project. Further details about each milestone are explained in Section 8.
In addition to the continuous evaluation by the project committee members, each graduation project will also be independently evaluated by the supervisor. The overall grade of students will be calculated by taking weighted average of the grades given by supervisor and committee members as explained further in Section Reference source not found.

3. Key Stakeholders and Their Roles

The main stakeholders of graduation project are students, supervisors, co-supervisors, committee members, GP coordinators, GPC, and CCSIT administrators including the college dean and the department chairs.

3.1 Students

Students are the primary stakeholders who are directly involved throughout the whole lifecycle of the graduation project.

Students are strongly encouraged to propose their own topics (project ideas) based on their background and interests. In doing so, they should formally and informally discuss with the faculty members, department chairs and GP coordinator to find the most suitable project and supervisor for themselves. Students may join any project offered or sponsored by faculty members or external partners. Students are expected to complete pre-registration using the prescribed form by the end of the 6th Semester.

Graduation projects are usually done in a group of two to three students under the supervision and guidance of a supervisor and two committee members. Students should work together as a team for a shared goal under the direction of their supervisor. Supervisor and students would carefully review and adopt the comments and feedback received from the committee members during the evaluation of each milestone.
Students must attend all bi-weekly project meetings with their supervisor and participate in the evaluation by the committee members at the end of each milestone. Students should follow the KFU code of conduct throughout their graduation project. Like any other course, absence or violation will be subject to KFU academic regulations.

In the event of a dispute or a problem, students may seek help and advice from their supervisor or GP coordinator who in turn consults the department chair and GPC to find an amicable solution towards successful completion of their graduation project.

For any grading related dispute, students or supervisor may request for a review of their grade to the GP coordinator. For a legitimate request, appropriate measures such as, arranging a re-evaluation or adjusting the committee appointment, can be taken by the GP coordinator after consultation of the department chair.

3.2 Supervisors and Co-Supervisors

The supervisors play a key role in guiding the students with their graduation project. They are responsible to schedule regular bi-weekly meetings with the students, allocate tasks to students as required to achieve short and long-term project goals. They should also submit the report of bi-weekly meeting to the GP coordinator regularly using the prescribed form.

During the pre-registration, the supervisor of each project should propose the committee members (and co-supervisor, if needed) for consideration by the department chair. Upon approval of a project, the supervisor should coordinate with the co-supervisor and committee members to facilitate the smooth progress of the student’s project.

A co-supervisor may be needed to coordinate with female section and for multidisciplinary or industry-sponsored projects. Appointment of co-supervisor and the role he/she would play, largely depend on the supervisor. The committee members
will evaluate the project at each milestone and give necessary feedback to ensure quality of projects. At the end of each milestone, the supervisor would review the comments and feedback received from the committee members, and guide the students accordingly for subsequent milestones.

### 3.3 Committee Members

Two committee members for each project are nominated by the supervisor (subject to approval by the department). Committee members are expected to possess relevant knowledge and expertise to evaluate as well as facilitate the project. Committee members are preferably selected from the faculty of the college or KFU in order to facilitate frequent interactions.

Committee members will evaluate the projects at each milestone based on the proposed criteria as prescribed in the evaluation forms. Being an indispensable part of the project, the committee members will not only evaluate the project but also provide continuous feedback and support to help the students and supervisor improving the quality of their graduation project. Therefore, the committee members will closely work with the supervisor as well as the students as a team to bring the best out of each graduation project.

### 3.4 Graduation Project Committee (GPC)

The GPC is responsible to facilitate and coordinate the graduation projects related matters in the college. The GPC comprises GP coordinators nominated by each department. The GPC is chaired by an experienced faculty member nominated by the college. The primary roles of the GPC are to:

- Trace and track progresses and problems.
- Act as facilitator and mediator as appropriate.
- Organize events (workshops and seminars) to promote awareness and to prepare students for their graduation projects.
• Offer necessary administrative supports to the college and departments (such as, preparation and approval of grades, archiving students’ projects, nominating innovative projects for awards, etc.).
• Showcase student’s project in prestigious internal and external events with the support from departments and college.

3.5 CCSIT Administration

The department chair will nominate a GP Coordinator from within the department. The GP coordinators will assist the department chairs with the graduation project related matters in the department, and will also liaise with the GPC.

By identifying the expected number of graduating students in each program, the GP coordinators will coordinate with prospective students, faculty members and the GPC to facilitate a smooth pre-registration well before the actual registration of Project Proposal begins.

Each department may formulate its own policy about project solicitation and allocation related matters. For example, who will be given the priority if more than one group of students is interested in one project; how to make sure that a newly appointed faculty member will have some project students; or how to avoid a situation where a particular faculty member is overwhelmed by supervisory duties?

The college administration will provide necessary support to the students and supervisors to successfully complete the graduation project. They will also sponsor events and encourage students to showcase their projects within and outside the university. The college administrators will also ensure that KFU guidelines for attendance, violation, dispute as well as intellectual property and copyright related matters are strictly followed by all parties involved in the graduation project supervision.
4. Project Selection and Pre-registration

Graduation projects are generally carried out in a group over two consecutive semesters under the supervision of a faculty member. Unlike other courses, a pre-registration process is essential to ensure that every group of prospective students selects a suitable project and a supervisor well in advance so that they can start working right from the first day of the 7th semester.

At the end of the 6th semester, students are advised to form a group consisting of 2 or 3 members. Graduating students are actively encouraged to propose their own project ideas and discuss them with faculty members who might be interested in supervising them or the department’s GP coordinator for further discussion and possible supervision. The GP coordinators will also actively seek out project topics with brief descriptions from faculty members and external partners and share them with the prospective students and faculty. Students may approach the GP coordinators and review the list of projects available in various departments in the college, and bid for a suitable project for themselves. When more than one group of students bid for the same project, the supervisor or the GP coordinator may choose the right group based on the department’s policy. The GPC along with the college administration should try to facilitate variety of innovative, multidisciplinary and industry-sponsored graduation projects by encouraging active participation of students, faculty members as well as external partners.

Once the project topic and supervisor are agreed upon, students should fill in the graduation project pre-registration form. The pre-registration form contains a summary or abstract of the project. The supervisor and department should also ensure that key resources needed to complete the project are available or can be made available on a timely basis. The supervisor may nominate two faculty members as committee (and co-supervisor, if needed) and submit the pre-registration form to the department’s GP coordinator for approval by the department. The project will be assigned a Project ID by the department’s GP coordinator upon the approval of the project. Please refer to Appendix A for the Pre-Registration Form.
In principle, the topics and scope of the graduation projects may vary widely from program to program. Each program may provide its own guidelines about what can be an ideal graduation project and they need to be endorsed by the department in terms of workload, complexity and novelty in the context of the program objectives.

In general, graduation project should possess the following characteristics.

- **Comprise significant realistic challenges and constraints:** Graduation projects cannot be simplistic or available on the Internet or elsewhere as done or solved by others.

- **Provide opportunity to integrate knowledge from various courses in the curriculum and beyond:** Practical problem solving often requires applying knowledge acquired from various courses and disciplines as well as creating new knowledge. Graduation projects should focus on practical problem solving and innovation.

- **Offer opportunity for creativity:** Students should show their creativity in their project by investigating a new solution to an old problem or solving a new problem professionally with creativity and efficiency in mind. Graduation projects are significantly different from course projects. While course projects are didactic in nature and often repeated by groups of students, graduation projects are creative and innovative in nature.

- **Emphasize design, experimentation and hands-on skills:** Graduation projects should engage students in solving practical problems using systematic scientific approach. Graduation projects are intended to be intensive, and require active learning and significant effort in the planning, design and implementation. A substantial final written report and several presentations and demonstrations are also needed.

- **Provide major challenges in terms of planning, analysis, design, implementation, comparison and validation:** Depending on the project topic, students should follow the scientific methodology of their discipline and address the problem in an appropriate manner. For example, if a project is
related to software or system development, they should follow an existing system development methodology. If a proposed project is related to experimentation or simulation, they should adopt appropriate professional standards and practices accordingly and justify their contributions through necessary test, comparison and validation.

- **Reflect scientific and technical methodology and approach throughout:** A typical undergraduate curriculum emphasizes on relevant professional practices and standards as well as detailed methodologies. While doing a graduation project, students should adhere to such professional practices to demonstrate that they are ready to work as professionals as expected.

- **Require significant efforts corresponding to the credit requirement:** One credit-hour is equivalent to 1-hour of lecture or 3-hours of practical work per week over a period of 16 weeks. Project Proposal and Project Implementation are also guided by such credit (work-load) constraints. Since graduation projects are done in groups, the estimated work-load needs to be justified in line with the number of students involved in the project and the credit requirements.

- **Allow teamwork among students in one or more majors:** A good team often comprises people with diverse background and skills. In the graduation project, students should work together in a group to achieve a shared goal. They should collaborate together effectively by sharing responsibility and knowledge, and demonstrate positive attitude and ethical behavior at all time. For interdisciplinary or industry-sponsored projects, co-supervisor or committee members from other department and industry may offer useful expert advice and insights for the project.

- **Include acceptable and measurable deliverables as agreed by both the supervisors and committee members:** Setting and achieving goals effectively and timely are crucial to the success of any project. Students should follow the guidance of their supervisors in setting and achieving short-term and long-term goals. Progress can be measured by the supervisor and
committee members. Regular meetings should be held to trace and track progress and problems with the project. Minutes of meetings and interim reports should be kept consistently. In an unfortunate event of dispute or problem, such documentation is useful for both mediation and conflict resolution.

- **Realizable within two semesters:** Students and supervisors should consider the time constraints practically to define the scope of the graduation project and to make realistic plans accordingly.

- **Required resources must be available or supported by the university or sponsor:** Success of a project depends on availability and access to necessary resources (including hardware, software and other resources such as data, specialized equipment and people with required expertise). During the pre-registration phase of a project, students and supervisors should make sure that all necessary resources are available or can be made available as needed. Industry-sponsored projects may acquire additional resources through the sponsor subject to the terms and conditions set by the university and the sponsor.

- **Community Engagement:** In line with the university mission, projects that address the needs of the community are highly recommended. Interdisciplinary and industry-sponsored projects are also strongly recommended as graduation project since they often offer an opportunity for students to acquire and integrate knowledge across various disciplines in solving practical problems.

While a CIS related graduation project may require students to follow the entire software development life-cycle (including analysis, design and implementation/coding of an entire system), a CS or CN project may involve significant analytical, experimental or other work (proof-of-concept, simulation, benchmarking) with some coding depending on the nature of the project. In this context, it should also be noted that the amount of coding required in project implementation may vary significantly from project to project. That is, project
implementation is not synonymous with coding as it may be often misunderstood in
the context of computing.

5. Biweekly Project Meetings and Reports

Graduation projects are closely guided by faculty members as supervisors. The
supervisor and the students are required to meet on a regular basis and keep track of
their progress and problems.

The students and supervisors are required to meet at least once in every two
weeks and the report of these meetings will be submitted by the supervisor to the GP
coordinator. Bi-weekly reports may include information on task allocation related to
short and long-term project goals as well as supervisor’s comments on progress and
problems. Please refer to Appendix A for the prescribed form related to Bi-weekly
Meeting.

It should be noted that bi-weekly reporting is a minimum reporting
requirement to trace and track progress and problems. In reality, supervisors and
students may need to meet as frequently as necessary to successfully complete the
graduation project within two semesters.

Supervisors should keep the attendance record of all project meetings. Any
continued absence or serious irregularities should be reported to the GP coordinator as
soon as possible. If a student fails to attend 75% of the scheduled meetings, he or she
will be denied from final project evaluation. According to KFU regulations, students
are advised to submit a letter of excuse in case they fail to attend any scheduled
meeting.

6. Evaluations and Grading

While working on the graduation project, students will have several
opportunities to present their work to their supervisor and the committee members for
evaluation and feedback. Graduation project consists of Project Proposal and Project
Implementation. These are graded separately in their respective semesters. There are
three milestones for Project Proposal and two milestones for Project Implementation.
At the end of each milestone, the students will submit a report as well as make a presentation in front of their project committee members. The committee members will use relevant evaluation form (see Appendix A) to evaluate each project independently at each milestone. The evaluation forms consist of a set of evaluation criteria and separate grade-columns for individual student’s grade. Whenever possible, the committee members should try to evaluate individual student’s achievement rather than the group performance. The committee members are also expected to provide detailed written feedback and comments along with the grade. After each milestone, the supervisor is expected to carefully review the comments and feedback received from the committee members and guide the students accordingly.

At the end of both Project Proposal and Project Implementation, the supervisor will holistically evaluate each project and individual student’s ability, as appropriate, using relevant evaluation form (see Appendix A).

The overall grade of a student in the Project Proposal or Project Implementation will be calculated based on the grades he or she receives during each evaluation phase and milestone from different evaluators. Student’s overall grade is calculated from supervisor’s grade (40%) and committee members’ grade (60%) over 2 or 3 milestones as appropriate (see Table 1 and Table 2 for Project Proposal and Project Implementation grade distribution respectively). Each committee member’s grade contributes to 30% of the overall grade.

*Table 1: Project Submission and Evaluation Schedule with Grade Distribution for Project Proposal (Semester 7)*

<table>
<thead>
<tr>
<th>Phase</th>
<th>Week #</th>
<th>Grade Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Report Submission</td>
<td>Evaluation</td>
</tr>
<tr>
<td>1. Milestone 1</td>
<td>4th</td>
<td>5th</td>
</tr>
<tr>
<td>2. Milestone 2</td>
<td>8th</td>
<td>9th</td>
</tr>
<tr>
<td>3. Milestone 3</td>
<td>15th</td>
<td>16th</td>
</tr>
<tr>
<td></td>
<td>Total (100) =</td>
<td></td>
</tr>
</tbody>
</table>
### Table 2: Project Submission and Evaluation Schedule with Grade Distribution for Project Implementation (Semester 8)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Week #</th>
<th>Grade Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Report Submission</td>
<td>Evaluation</td>
</tr>
<tr>
<td>1. Milestone 4</td>
<td>7th</td>
<td>8th</td>
</tr>
<tr>
<td>2. Milestone 5</td>
<td>15th</td>
<td>16th</td>
</tr>
<tr>
<td><strong>Total (100)</strong></td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

### 6.1 General Guidelines for Evaluation

While grading graduation projects, both supervisors and committee members should consider student’s report, presentation and Q&A comprehensively. In grading each criterion in the evaluation form, proper attention should be given to individual student’s ability rather than the group performance. For certain evaluation criterion, however, it is likely that all students in the same project may inevitably receive the same grade.

The graduation project is a capstone of an undergraduate curriculum where students try to apply their knowledge comprehensively in solving a complex and realistic problem. Therefore, the evaluators should try to evaluate student’s high-level learning outcomes by means of a set of predefined evaluation criteria as compiled in the respective evaluation forms (see Appendix A).

In all evaluations, students’ ability of communication (report and presentation) and team work (professionalism, cooperation and ethical behavior) will be taken into consideration. However, the scientific and technical aspects and achievements of the project will play the key role in evaluation. Each evaluator (supervisor or committee member) would conduct their evaluations independently to ensure that the students get fair grades.

Reports and presentations for each evaluation should be organized logically and prepared professionally using correct spelling, grammar, format and style. Students should follow the recommended formatting and style in preparing their reports and presentations using the prescribed templates (see Appendix B).
technical contents should be presented clearly, precisely and comprehensively that highlights the student’s contributions and achievements.

Graduation projects require teamwork to achieve a shared goal. It is recommended that the report and presentation should clearly explain the major tasks performed by each student and highlight different contributions made by each member in the team. Evaluators are encouraged to ask questions to identify individual student’s contributions.

The department reserves the right to deduct up to 10% of student’s grade for certain irregularities (for example, non-cooperation or delay in submission of bound final report for archival).

It is recommended that each evaluator should take advantage of the Q&A session, to ask questions so that the other evaluator, supervisor and students become aware of the strengths and weaknesses of the project and the contributions of individual students. A vigorous Q&A session helps building informal consensus among the evaluators which indirectly helps avoiding grading disparity (of having one evaluator giving a very high grade while the other giving a very low grade).

6.2 Minimum Passing Criteria

All graduation projects should meet certain minimum requirements to be eligible for final evaluation as follows:

- The workload should roughly correspond with credit-hour multiplied by the number of students in the group.

- The achievement and deliverables should be acceptable by both the supervisor and the committee members.

- The project comprises of original work with no evidence of plagiarism and other academic misconducts.

If the effort of the project is not adequate or the deliverables are below acceptable standard, the department chair would consider granting extended time for
successful completion based on recommendation of the supervisor and committee members. In this case, the project will be considered incomplete (I.C.) and will be further evaluated according to university policy.

A student will be denied from attending final evaluation (with an F grade recorded) if he or she fails to attend 75% of regular meetings and seminars as set by the supervisor and committee. For every absence, students are advised to submit a letter of excuse to their supervisor. In extreme cases, where all team members fail to meet the attendance requirement, the project will be terminated with F grade recorded for all students.

The student will be awarded F grade if plagiarism or any other academic misconduct can be proven with sufficient evidence. Disciplinary action will also be taken for any misconduct discovered at any stage of the project according to university guidelines.

6.3 Delays and Penalties

All graduation project students should strictly follow the milestone evaluation schedule endorsed by the college, and submit reports and make presentations before each deadline. Students and supervisors are requested to seek prior approval from the department chair if they are unable to submit reports or make presentations on time. For unapproved delays including failure to submit a report or make a presentation will result in various penalties as explained below.

6.3.1 Approved Delays

The students and supervisors must seek prior approval from the department chair if they are unable to submit the report or make a presentation according to the evaluation schedule due to any legitimate reason (such as, illness or unavailability of a committee member). With prior approval by the department chair in writing, a milestone evaluation can be arranged on a later date. However, an evaluation can't be postponed beyond the next milestone evaluation. Students must submit their report
prior to the presentation as approved by the department. For delayed submission of report with such prior approval and subsequent evaluation, there will be no penalty.

6.3.2 Unapproved Delay in Report Submission

If the students fail to submit the report and no prior approval is granted by the department chair, the supervisors and the committee members reserve the right to deduct student's report-related grades based on their own judgments and according to the severity of the delay. The defaulting students cannot appeal against such penalties. No report will be accepted during and after the evaluation. If the students fail to submit their report before the evaluation, no grade should be given for the report.

6.3.3 Unapproved Delay in Presentation

Milestone evaluation requires students to make a presentation after submitting the report. All students must be present during the evaluation. If students fail to present their work for a milestone, they will be given no grade for that milestone.

Graduation project is a continuous and lengthy process. One of the crucial criteria of graduation project evaluation is the student’s ability to work as a team with specific tasks and deadline. Therefore, to avoid poor grades and subsequent predicament, students and supervisors are advised to strictly adhere to the milestone evaluation schedule recommended by the college.

6.4 Nomination for Awards

The departments will nominate selected projects for recognitions (awards or prizes). The nominations should be judged by some tangible evidences or potentials as follows:

- Participation in regional/national competitions representing the college/university
• Presentation in conferences, workshops or any other form of publications

• Other types of creative contribution in the form of patentable intellectual property or commercial products or services

• Contribution to university/college operations and missions in terms of community engagement and community service

• Sponsorship from industry partners and collaborators

• Interdisciplinary nature of project

7. Structure of the Report and Presentation

The GPC recommends that each group uses a coherent style, format and structure of their project report. The preliminary and final parts of the report are rather fixed as explained below. However, the main body of the report containing relevant information related to each milestone, may be freely structured and organized according to the supervisor and students’ preferences.

Appendix B contains the templates for graduation project report and presentation. Students are advised to get the electronic template files from CCSIT website.

7.1 Preliminary Part of the Report

The required pages in the beginning of the report are Cover Page, Acknowledgement, Undertaking, Abstract and Table of Contents.

7.1.1 Cover Page

The cover page should contain the KFU logo, a citation of the country, ministry, university and college, the project title, the students’ information, name(s) of supervisor (and co-supervisor), names of the committee members and date (month and year) of submission.
The KFU logo should appear at the top of the cover page. Project’s title should be brief but precise to sufficiently reflect the overall project. The name of the supervisor must be placed in the lower part of the cover page. The month and year of submission should be mentioned at the bottom of the cover page. The cover page of the final report for Milestone 5 contains the same items as in the first cover page except that the milestone name is replaced with an italicized excerpt, “Project submitted in partial fulfillment of the requirements for the degree of …”.

7.1.2 Acknowledgement

The acknowledgement is a statement of gratitude for assistance to accomplish the project. It may mention the names of the people the project members want to thank for their support in the project (usually parents, friends, instructors).

7.1.3 Undertaking

This is a confirmation that the project is an original work. All the analysis, design and system have been accomplished by the project members and it has not been submitted to any other college and university. All the students must sign the undertaking page.

7.1.4 Abstract

An abstract should contain a brief outline of the project (or the current progress of the project for interim reports). It should describe the key challenges or problems, the methodology and approach used, and the major findings or outcomes. It should not exceed 300 words. An example is included in the template in Appendix B.

7.1.5 Table of Contents

It includes all preliminary, body, and ending sections and subsections’ headings and their page numbers. The list of contents should only include
subheadings up to the 3rd level, i.e. headings of level 4 or more, like 1.1.1.1 or 1.1.1.1.1, should not appear in the table of contents.

A list of figures and a list of tables should also be added with page numbers. They should include the table and figure numbers, captions and page numbers in which they appear inside the document. An example is included in the template in Appendix B.

7.2 Final Part of the Report

The four sections at the end of a report are the Conclusion, Major Contributions, References and Appendices (if applicable). While Conclusions and References sections are mandatory, Major Contributions and Appendices sections are optional.

7.2.1 Conclusion

Each report should include a conclusion section or a chapter that summarizes the project challenges and achievements of the project in detail. Students should carefully write this section in consultation with the supervisor to highlight their achievements clearly.

In addition, this section should include description of major project learning outcomes, recommendations for project improvement and suggestions for scope extension.

7.2.2 Major Contributions

In this section, students should list the major tasks each student, as member of the team, has performed as well as highlight the major individual contributions for the success of the project. It is expected that all students fairly share responsibly the tasks of the project under the direction of the supervisor.
7.2.3 References

This section lists all types of information sources that were used for writing different project reports. The students are required to provide correct citations at relevant positions inside the body of the report for every cited source. For more information about reference styles, please refer to Appendix B.

7.2.4 Appendix

This section may support students’ need to attach secondary material like source code, user manual, or other relevant information not suitable in the body of the report.

Secondary materials which are of the same nature should be gathered under the same appendix heading. For example, students may need to have one appendix for all secondary source codes, one appendix for all secondary forms … etc.

The students should use a capital letter numbering style for the appendices, i.e. A, B, C …, as used in writing this document.

7.3 The Body of the Report

The body of the report can be structured and organized based on the material and content of the report. Different types of graduation projects from different programs may require different organization. In general, contents are to be organized in relevant chapters with some meaningful headings as appropriate for the project. Typical chapter headings may include some of the following: Introduction, Motivation and Background, Literature Review, Material and Methods, Analysis and Design, System Architecture, Experimental Setup, Implementation, Result Analysis, Evaluation and Comparison etc. Each chapter can be further divided into sections and subsections as necessary.
It is expected that the report will be written in an incremental and iterative fashion throughout each milestone. The students may like to cumulatively refine existing contents and add new contents to suit the purpose of the report at each milestone.

The expected content and information required for each milestone are explained in the Section 8 later in this handbook. At each milestone, students should consult their supervisor and seek his or her comments and advice on their draft report before finalizing the report for submission.

Each group should submit a Final Report (bound hardcopy report after incorporating all corrections recommended by the supervisor and the committee) to the supervisor within a week after their final presentation. The supervisor will forward one copy of the final report to the GP coordinator for archival in the college library.

7.4 Project Presentation and Demonstration

Students are requested to use the prescribed template (See Appendix B) to prepare their presentation. Some project may substitute presentation largely with demonstrations. Making good presentation and demonstration requires significant effort and proper rehearsal. Students are advised to pay due attention to improve their presentation skills. Rehearsing presentations with the supervisor or friends are strongly recommended as this may help building confidence for the actual presentation. Failure to present the project professionally may lead to poor grades.

8. Project Milestones

Graduation projects will be evaluated at different stages by various evaluators (supervisors and committee members). There are 5 milestones for the graduation project as outlined below. The student should prepare their report and presentation for each milestone carefully to suit the purpose of evaluation at each milestone. Evaluation forms are available in Appendix A. The templates for the report and presentation are available in Appendix B.
8.1 Milestone 1

The first evaluation of project proposal takes place at Milestone 1 during the 5th week of the 7th semester. The report of this evaluation should be submitted in the 4th week (See Table 1 in Section 6).

During the initial evaluation, students’ understanding and preparedness concerning the selected project will be assessed. By this stage, students should be able to demonstrate their ability to analyze the problem, and identify and define the computing requirements for the project. They should be also able to illustrate the local and global impact of their project on individuals, organizations, and society as a whole. The students are expected to provide the following information convincingly in their report and presentation for this milestone:

- Background of the project
- Motivation for the project
- Problem statement
- Scope of the project
- Project baseline requirements
- Expected outcomes
- Identified tasks and a tentative work plan

The above bulleted items should not necessarily be taken as section headings/slide titles for the report and the presentation. This applies to the report and presentation for subsequent milestones as well.

In this early stage of project evaluation, the evaluators (supervisors and committee members) will not only give grades, they will also provide valuable feedback to the students to improve the project in terms of quality.
8.2 Milestone 2

The second evaluation of project proposal takes place at Milestone 2 during the 9th week of the 7th semester. The report of this evaluation should be submitted in the 8th week of the same semester (See Table 1 in Section 6).

During the second stage of evaluation, the students are expected to show their maturity in handling the project by making significant progress as planned. They should be able to demonstrate their ability to apply knowledge of computing and mathematics and define the computing requirements appropriate for proposed solution. The students are expected to provide the following information in their report and presentation for this milestone:

- Background of the project
- Motivation for the project
- Problem statement
- Scope of the project
- **Comprehensive analysis of related work**
- **Detailed project requirements**
- **Identification of alternative solutions/approaches and justification of selecting a solution/approach**
- Expected outcomes
- Identified tasks and a realistic work plan

Some items above are inevitably accumulated from the initial phase and to be adapted further in the final phase. Any such revision and update should be explained or justified in detail. The new items/information for this milestone, are highlighted above in bold.
8.3 Milestone 3

The third evaluation of project proposal takes place at Milestone 3 during the 16th week of the 7th semester. The report of this evaluation should be submitted in the 15th week of the same semester (See Table 1 in Section 6).

During the final stage of project proposal students should prepare and present a comprehensive project proposal. They should be able to show their competency in analyzing the problem at hand and designing a computer-based system, process, component, or program to meet desired need of the project. They should also demonstrate their ability in using current tools and techniques and engaging themselves in continuing professional development. They are also expected to show their awareness about professional, ethical, legal, security and social issues and responsibilities. Students are required to present and defend a comprehensive project proposal during the final proposal evaluation containing the following information.

- Background of the project
- Motivation for the project
- Problem statement
- Scope of the project
- Comprehensive analysis of related work
- Project requirements
- Identification of alternative solutions/approaches and justification of selecting a solution/approach
- Discussion of tools and techniques used during project proposal
- Appropriate analysis
- Details of proposed design conforming to the problem statement
- Description of tools and techniques to be used during project implementation
- Identified tasks and a realistic work plan for project implementation
Both the supervisors and the committee members will evaluate the final project proposal using relevant evaluation forms. It is strongly recommended that students carefully note all the comments made by the supervisors and committee members during the final proposal defense and try to incorporate them accordingly in the Project Implementation phase.

### 8.4 Milestone 4

The first evaluation of project implementation takes place at Milestone 4 during the 8th week of the 8th semester. The report of this evaluation should be submitted in the 7th week of the same semester (See Table 2 in Section 6).

During the first half of the implementation phase the students are expected to make acceptable progress in implementing the project. Although not complete yet, students should be able to show their ability to implement and evaluate a computer-based system, process, component, or program to meet desired need of the project. They should also demonstrate their capability to use current tools and techniques and engage themselves in continuing professional development. Students are required to provide the following information during the midterm project evaluation:

- Background of the project
- Motivation for the project
- Problem statement
- Scope of the project
- Comprehensive analysis of related work
- Project requirements
- Identification of alternative solutions/approaches and justification of selecting a solution/approach
- Appropriate analysis
- **Details of partial implementation conforming to the design of the proposal phase**
- **Commands of tools and techniques being used during project implementation**
• Preliminary outcomes/results
• Analysis of preliminary result through comparison, validation or verification
• Remarks on preliminary results and intermediate conclusions
• Identified tasks and a realistic work plan for next phase

In general, in the second-half of the project implementation, students will be spending more time in testing and validation of their projects as well as writing a comprehensive report. Therefore, by this stage, most students will be finishing a major part of their project implementation. Nonetheless, if there is any major change in project implementation with respect to the project proposal, students should justify/discuss such matters during the midterm evaluation with the supervisor and committee for approval. The supervisor should formally seek approval for such changes from the department using the prescribed form.

8.5 Milestone 5

The second evaluation of project implementation takes place at Milestone 5 during the 16th week of the 8th semester. The report of this evaluation should be submitted in the 15th week of the same semester (See Table 2 in Section 6).

During the final phase of implementation, students are expected to complete their projects according to their project proposal. They should highlight their achievement and contribution appropriately. By the end of implementation phase students should be able to show their ability to implement and evaluate a computer-based system, process, component, or program to meet desired needs of the project. They should also demonstrate their capability to use current tools and techniques and engage themselves in continuing professional development. They are expected to show their awareness about professional, ethical, legal, security and social issues and responsibilities by the end of this phase. The students are expected to provide the following information by the end of final phase:

• Background of the project
• Motivation for the project
• Problem statement
• Scope of the project
• Comprehensive analysis of related work
• Project requirements
• Identification of alternative solutions/approaches and justification of selecting a solution/approach
• Appropriate analysis
• Details of project implementation conforming to project proposal
• Mastery of tools and techniques used in project implementation
• Overall project outcome/achievements
• Analysis of overall result through comparison, validation or verification
• Comprehensive remarks on overall project outcome and achievements (conclusions and future work)

9. Deliverables, Copyright and Intellectual Property Rights

At the completion of the graduation project, students are required to return all university properties back to the college through their supervisors. Students must also submit all deliverables and outputs of the projects (software, hardware and data used and produced by the project; source codes with carefully written readme or how-to instructions, etc.) so that others can easily reproduce their work or reuse all or part of their work in future. Moreover, it is recommended that students copy the final version of their report and presentation on a CD and pass it to the supervisor for electronic archival at the college.

The university is the rightful owner of copyright and all intellectual property rights of all student's work. Any tangible and intangible benefits (including publications, financial proceeds) from students’ project should be shared among students, faculty and the university based on the department's policy in line with the university intellectual property regulations.

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10. Conclusions

The graduation project is a major component of an undergraduate curriculum which offers students a unique opportunity to work as a team to solve realistic and practical problem with significant complexity under the guidance of a supervisor. The supervisor closely guides the students over two semesters and evaluates their achievements. The committee members oversee and evaluate the project throughout the five milestones.

The successful completion of graduation project is an indication of the students’ preparedness to pursue a professional career. At the same time, the variety and quality of graduation projects in the college certainly reflect the academic achievement of the College of Computer Sciences and Information Technology at King Faisal University.

The GPC is pleased to act as a facilitator to support every stakeholder towards smooth and successful completion of innovative and high-quality graduation projects at the college. The GPC cordially welcomes your comments and suggestions.
Appendix A: Graduation Project Forms

1. Project Pre-Registration Form
2. Report of Biweekly Project Meeting
3. Graduation Project – General Request Form
4. Project Proposal Milestone 1 Evaluation Form
5. Project Proposal Milestone 2 Evaluation Form
6. Project Proposal Milestone 3 Evaluation Form
7. Project Proposal – Supervisor’s Evaluation Form
8. Project Implementation Milestone 4 Evaluation Form
9. Project Implementation Milestone 5 Evaluation Form
10. Project Implementation – Supervisor’s Evaluation Form
Appendix B: Graduation Project Templates

1. Template for Report
2. Template for Presentation
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABET</td>
<td>Accreditation Board for Engineering and Technology</td>
</tr>
<tr>
<td>ACM</td>
<td>Association for Computing Machinery</td>
</tr>
<tr>
<td>CCSIT</td>
<td>College of Computer Sciences and Information Technology</td>
</tr>
<tr>
<td>CIS</td>
<td>Computer Information Systems</td>
</tr>
<tr>
<td>CN</td>
<td>Computer Networking</td>
</tr>
<tr>
<td>CS</td>
<td>Computer Science</td>
</tr>
<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineering</td>
</tr>
<tr>
<td>GPC</td>
<td>Graduate Project Committee</td>
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<td>Graduate Project Coordinator</td>
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<td>King Faisal University</td>
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</tbody>
</table>