FORMAN CHRISTIAN COLLEGE
(A CHARTERED UNIVERSITY)

Computer Science Senior Project Guidebook

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Foreword

This is the Senior Project handbook of the Department of Computer Science at Forman Christian College, Lahore. This handbook contains guidelines for the conception, preparation, implementation, completion and finally the assessment of Senior Project. The intention of this handbook is to develop guidelines and a uniform structure and outline for undergraduate students. It serves as an instructional manual for the expected contents, deliverables, quality and the required quantity of the final projects for students and also provides evaluation rubrics for supervisors and evaluators.

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Chapter 1

Introduction

COMP 497 Senior Project (SProj) is a major requirement for graduating in Baccalaureate of Computer Science from Forman Christian College University (FCCU). This guidebook is intended to provide a complete guideline to students in planning, implementing and documenting a project work, in line with the requirements of the relevant academic programme accreditation bodies.

1.1 SProj Requirements

To enrol in this course a student must have completed 90 credit hour requirement AND hold senior standing i.e. 7th semester. COMP497 is a 6 credit hour course divided in to two parts: COMP497A and COMP497B, over a span of two semesters. In case a student is unable to produce an SProj in the allotted time, a maximum of one extra semester will be allowed. Students are encouraged to work in groups of 3 for a more productive project while learning communication skills and teamwork.

1.2 SProj Objective

SProj is a depiction and amalgamation of the skills and knowledge learnt during the student's course work. It also encompasses the strengths of self learning and motivation in the field of computer science. The students are expected to use their creativity, skills and knowledge to solve a cutting edge problem or provide an innovative solution independently.

1. Document all findings and problems encountered during the implementation.

2. Apply practical hands-on techniques in process, quality control and provide related analysis in their specialized academic programme.

3. Demonstrate the procedures and methods of project implementation.

4. Execute the sequence in various steps required to produce/ manufacture/ test/ solve/ improve real life industrial projects problems.

5. Discuss findings and results of the project.

6. Produce a technical report and perform a project presentation.

1.3 Project Scope

Projects should be challenging and meet the programme requirements where students should be able to demonstrate the ability to plan, perform the necessary studies and analysis, time and resource management, work independently and present the project outcomes in oral and written. The university always encourages the projects which are related to industrial problems so they gain hands on experience. However, projects could also be performed based on the following mode:

- laboratory experimentation

- design / build and test

- analytical work

- numerical simulations

- industrial based projects

- any other mode subjected to programme requirements

Chapter 2

SProj Process

In this section the detailed breakdown of COMP497 A and B are mentioned. However, exact dates will be disseminated every semester.

2.1 SProj - COMP497A

The basic timeline for COMP497A is shown in Fig 2.1. The exact dates will be shared with the students at the start of every semester.

2.1.1 Group Finalization

Students must form a group of 3 and justify the scope of their project. Students are not encouraged to work alone as their project scope will be reduced. Students can group up in fours only if the project scope is large enough. Once the students have grouped up, they are required to select their project Primary Advisor from amongst the faculty members of Department of Computer Science. List of faculty members can be found at:

https://www.fccollege.edu.pk/team/department-of-computer-science/.

Every project is required to select a Secondary Advisor from amongst the faculty members of CS department **OR** faculty members from other departments for cross departmental projects **OR** from the industry. Selecting groups members, primary and secondary advisors is solely the students' responsibility. After group finalization, the following performa has to be filled and kept with the students for record purposes.

Please note that every faculty member can advise a total of 5 projects as primary advisor in an academic year.

2.1.2 SProj Title Selection

Students are required to work in close collaboration with their advisors to select their project domain and finalize project scope as requirements in Chapter 1. Students are expected to come up with new innovative ideas and repetition of previous project ideas is strictly not allowed. Previously conducted projects are enlisted here:

https://www.fccollege.edu.pk/computer-science-projects/

2.1.3 Proposal Submission and Acceptance

Every group is supposed to prepare a detailed project proposal in accordance with the proposal template given to them. The proposal should be carefully and realistically drafted with guidance from the advisors. Proposal acceptance follows the following stages:
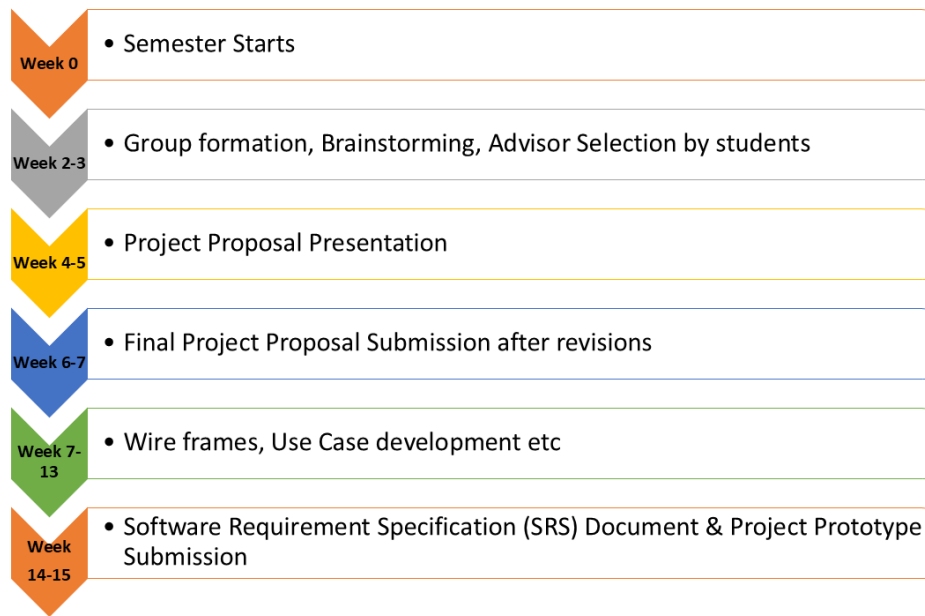
Figure 2.1: COMP497A Timeline

1. **Step 1:** Initial project proposal submission to the primary advisor.

2. **Step 2:** Present project proposal in front of panel of faculty members. The faculty panel will give final decisions

   - Accept
   - Accept with changes
   - Reject

3. **Step 3:** Submit final project proposal to primary advisor after making necessary changes as advised by the faculty panel.

After proposal acceptance, the project title and scope is locked and cannot be changed afterwards.

2.1.4 Final Deliverable: Software Requirement Specification (SRS) document and Project Prototype

After the proposal acceptance, the students are expected to start project prototyping and select development methodology, use cases, test cases and other details to prepare a Software Requirement Specification (SRS) document. Every project genre will have different SRS templates. The basic project genres are:

- SRS Game Oriented
- SRS Hardware Oriented Embedded
- SRS Research Based
- SRS Traditional Projects

Semester:_____			COMP 497 A
Sr No.	**Roll No.**	**Name**	**Sign**
1			
2			
3			

Name, Signature & Date:

Primary Advisor: _____ **Secondary Advisor:** _____

Figure 2.2: COMP497A Timeline

SRS must be carefully drafted with the advisors' input regarding sections to be added or removed. SRS must show a clear understanding of the Software Development Lifecycle (SDLC) to be followed. SRS should map directly on to the project prototype developed and must carefully depict Software Engineering course contents.

2.2 SProj - COMP 497 B

Students are required to register for COMP497-B via empower during the add-drop week of the following semester. The students are expected to refine their earlier developed prototypes into a full blown product after rigorous testing and feature addition. For research based projects, experimental testing and algorithm development should be strong to be able to publish a conference paper, if not journal. The students are advised to meet their advisors regularly. Basic timeline is shown in Figure 2.2 while exact dates will be shared at the start of every semester.

2.2.1 Final Deliverables

Every group has to prepare and submit the following as COMP-497B deliverables to their advisors:

1. **Project Report**

   A project report is to be prepared according to the standard template provided by the department. Sections can be added or removed as per advisor's discretion. The report must be 9,000 - 11,000 words long entailing non-repetitive details. Every figure and table must be referenced in the following explanatory paragraphs. Only high definition images should be added to the report. Figures and tables must be aligned to the top or bottom of the pages, not in center of the text. The report may include user manual, any customer reviews, papers published etc. but not code or screen shots of code. There must be no contractions in the text like cant́, arent́ etc, and formal way of writing must be followed not like a brochure. It is advisable to use LATEX for preparation of formal documents.
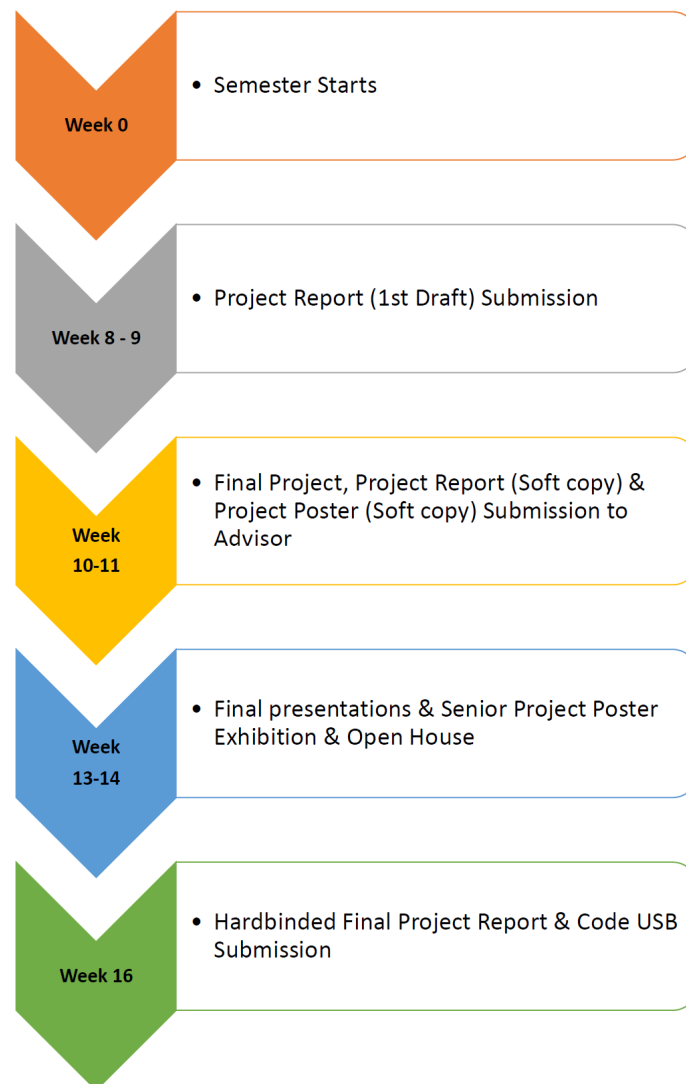
2. **Project Poster**

Figure 2.3: COMP497B Timeline

Students are expected to learn the art of displaying and marketing their work to a broader, cross domain audience. The poster must be printed only after being approved by the advisors and the cost of printing is borne by the student team.

- Size of the Flex Poster should be (Width=3' X Height=4')
- Poster Contents should include:
    - University Logo,
    - Department Name
    - Project Title,
    - Name/s and Roll Number/s of Project Author/s,
    - Name and Designations of Both Advisers,
    - Semester Information (FA21 etc)
- Application Project Poster (These are the material to be included, not headings):
    - Problem motivation, need
    - What you propose

- Aspects of your solution, mention all parts briefly, boast about your work
    - Results/conclusions like accuracy measures, customers etc.
- Research Project Poster (These can be the headings):
    - Motivation Introduction
    - Procedure/ Methods/Experiments, all important algorithm details
    - Results/Analysis
    - References
- Graphics (not limited to):
    - Block diagram
    - Significant User interfaces (not the login page)
    - Domain related
    - All must be readable when printed
- Poster must look:
    - Attractive, so any passer by stops to skim it
    - Professional/ Not childish
    - Good colors
    - Readable
    - Comprehensive (understandable and easy to follow)
    - Different and stand apart
- Maximum Text Limit for the whole poster is up to 400 words (avoid over stuffing and big unreadable paragraphs, use bullets)

3. **Final Project Presentation**

   Every group must also prepare a presentation of their project to be presented to eval-uators from the respective domains. The presentation must clearly display all aspects of the project as mentioned in the project report. Rules of presentation eg. loud and clear voice, good font size on projector, HD figures, less text more graphics must be followed. It should be interesting and must follow a story line. The presentation should not take longer than 30 minutes including demos and prototype testing.

2.2.2   Project Evaluation & Computer Science Senior Project Poster Exhibition and Competition (COMSPEX)

After submission and approval of the COMP497B deliverables, SProj groups will stand eligible for final project evaluation on the day of COMPSPEX. SProj groups will be responsible for displaying their project posters at the allocated space. Poster exhibition will be open for everyone and will be visited by various industrial and academic personnel. The students must be available with their posters throughout the exhibition time to demonstrate their projects.

Every SProj group will present their project in front of the evaluation panel in allocated rooms as per schedule. They must bring a ring-binded project report copy with them to the venue. The evaluation panel will consist of the following domain experts:

1. Advisor (40%)

2. External Examiner, not FCC faculty member (30%)

3. Internal Examiner A, FCC faculty member (15%)

4. Internal Examiner B, FCC faculty member (15%)

Each group will be allotted 45-60 minutes to present their project in front of the evaluators. They must display any prototypes, demos, proof-of-concept videos etc. They will explain the technical details of their projects, Software Development Lifecycle followed, demonstrate their use and test cases, scope of their project. The students will defend their project in QA session. Some sample questions observed are:

1. Which SDLC was followed for development?

2. Show the use-case diagram corresponding to X functionality.

3. Does your code reflects class diagrams?

4. Problem statement should be in the form of a statement and not bullet points. There are three parts of the problem statement i.e., What's do be done, Why are you doing what you are doing, and how are you going to do it.

5. The diagrams in the reports should be reflected in the code as well. For example, if you have a dashboard in the app, it should be in the diagrams as well. Similarly, class diagrams should also be coherent with the code. If a class name along with attributes is defined in the diagram, it should be implemented as vice versa. You can use online tools to generate class diagrams from your existing code.

6. Detailed DFD (not just level 0) should also be included.

7. Use cases should also map to the code.

8. Class diagrams are different than database ERDs and should not be treated as the same.

9. For the system diagram, always be careful when defining the primary and secondary actors and follow the software engineering conventions. Similarly, solid lines and dashed lines are also used in different contexts in UML diagrams.

The students are expected to be confident and well dressed on this day. It is a plus if they have practiced their presentation with more than 2 faculty members apart from their advisors.

Chapter 3

Evaluation Rubrics

Fig 3.1 shows the tentative mapping of Program Learning Outcomes (PLOs) to the respective grading elements of the SProj deliverables. Every group member will be assessed and grading individually despite the group work. after careful deliberation amongst the evaluation panel, the grades will be submitted to the exam office after which the grades will be considered final and un-contestable. COMP497A and B will be graded simultaneously after successful completion of COMP497B. Till then the grades for these courses will remain 'I" (incomplete).

3.1 Late Submission

It is the responsibility of each group to ensure they complete the milestones of each semester and submit deliverables by the cutoff submission date. No project will be accepted after the cutoff date and necessary actions will be taken as per the advisor and the evaluation committee decision policy.

3.2 Plagiarism

Each project must be the original work of student groups. The students need to be fully in touch with the advisors for better evaluation.

In the project report, for instance, if students have taken ideas or referencing other work as part of the proposed project, then, it must be cited and reference should be clearly specified. Same is the case while implementing the proposed solution. For instance, if students are developing project using 3rd party tools and libraries, it must be referenced and relevant comments and notes must be highlighted and will not be regarded as part of the original work of student groups. Hence, it is extremely important to note that it is the responsibility of students to ensure they are not plagiarizing knowingly or unknowingly. In order to prevent plagiarism related issues, students are encouraged to get familiar with plagiarism rules specified by the university.

If students are found plagiarizing either in project proposal report, SRS or in the project implementation solution/code, immediate strict action will be taken as per the university policy.

3.3 Awards

COMPSPEX closing ceremony will be held after all project evaluations are completed. The following awards will be announced after departmental deliberation. Giving cash prize or not

will be decided semester-wise.

- **Best Project Award**

This award will be given to the project which is technically challenging and fulfils a much needed gap in the society. The project must be completely deployed in case of application based projects and robust and sound in case of research based project. The contestants for the best project will be shortlisted on the day of presentation keeping the external evaluators and the evaluation panel's feeback. A jury comprising of senior members (with no conflict of interest) will further analyse the projects on COMSPEX to chose the best project.

- **Best Poster Award**

The best poster will be selected on COMSPEX based on eye-catching appearance, fulfils all requirements and creatively depicts complete working of a project to a broad audience.

3.4 Rules & Regulations

The following rules will be strictly followed:

1. In case a group is unable to meet deadlines, the advisor has the right to hold their grades.

2. Final grades are uncontestable.

3. If all members of a group fail to cooperate and contribute equally to the project, the SProj Committee has a right to disband the group so they may complete their project independently. However, the scope of project will not change.

4. If a student drops out of the course, the remaining students will have to complete the project on their own.

5. Students are not allowed to switch amongst groups.

6. Outsourced or plagiarised projects will be dealt according to zero tolerance policy of FCCU.

7. In case the primary advisor leaves/transfers, students will have to request for a new advisor.

8. If students are unable to complete the project in terms of scope, the advisor reserves the right not to allow them to present their project for evaluation. In this case, and "I (incomplete)" grade will be assigned to them. A new date of evaluation (after 2-3 months) will be given to the students to clear their incomplete status. In case the student fails to clear "I" grade in given extra time, the grade will automatically convert to "F", after which the students will have to re-register and pay for COMP497A and B in the following semesters.

		COMP497 A (35)							COMP497 B (65)									
		Proposal (5)	SRS (30)						Project Report (35)						Presentation (30)			
	Marks	Accept/Accept with revision	Problem Description	Literature Review	System Description	User Specifications	System Specifications	Prototype	Development Lifecycle	System Architecture	Tools/Techniques	Testing/Quality	Poster	Plagiarism	Clarity	Demo	Participation	QA
		0 - 5	0-5	0-5	0-5	0-5	0-5	0-5	0 - 5	0 - 5	0 - 10	0 - 5	0 - 5	0 - 5	0-10	0-10	0 - 5	0 - 5
PLO 1	Academic Education						x		x	x								
PLO 2	Knowledge for Solving Computing Problems		x	x	x	x	x	x										
PLO 3	Problem Analysis	x	x		x													
PLO 4	Design/Development of Solutions									x								
PLO 5	Modern Tool Usage										x							
PLO 6	Individual and Teamwork												x		x		x	x
PLO 7	Communication		x		x								x		x		x	x
PLO 8	Computing Professionalism and Society	x										x						
PLO 9	Ethics											x		x				
PLO 10	Lifelong Learning												x					

Figure 3.1: Grading rubrics