NATIONAL UNIVERSITY
of Computer & Emerging Sciences

BS FINAL YEAR PROJECT HANDBOOK 2023

(FAST SCHOOL OF COMPUTING)

Chiniot-Faisalabad-Islamabad-Karachi-Lahore-Peshawar
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Revised October 2023

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Preface

The National University of Computer and Emerging Sciences (FAST-NU) is a pioneer of computing education in the country. The University aspires to promote research and development. The aim is to produce skilled graduates who are knowledge, well- trained, confident, and fully equipped with all necessary skills to address the emerging needs of the industry, at the national level as well as the international level. The students are expected to meet these goals through their enthusiasm, intelligence, commitment, and tireless efforts.

The Final Year Project (FYP) provides an excellent opportunity to each student in acquiring state of the art knowledge and applying it in the various fields of computing. The FYP plays a significant role in the accomplishment of overall objectives of excellence in undergraduate studies. It also provides a great opportunity for team building. This handbook provides important guidelines and rules and regulations for the two-semester duration of the FYP. Students are expected to follow these guidelines to achieve the overall goal of academic excellence.

It is envisioned that the students of FAST-NU will be the leaders of the research and development activities in the field of computing and achieve high accolades. The University team, the management, the faculty, and staff will always be available to provide support and guidance to the students in this context.

May God give us guidance and prosperity!

Dr Jawwad Ahmed Shamsi
Dean (Faculty of Computing)

Acknowledgements

Efforts and contributions from Islamabad campus faculty members namely, Dr. Aftab A. Maroof, Dr. Rauf Baig, Dr. Arshad A. Shahid, Dr. Kashif Munir, Dr. Umar Manzoor, Dr. Naveed Ejaz, Mr. Ikram ul Haq. Dr. Uzair Khan, Dr. Atif Jilani, Ms. Saba Rasheed, Dr. Amna Basharat, Mr. Hassan Mustafa, and Dr. Shujaat Hussain for preparing the first version of the FYP handbook are remarkable.

A Committee headed by Dr. Kashif Munir and comprising of FYP Coordinators of Computing Departments across all campuses discussed and finalized the handbook. Ms Sameera Sultan from Karachi campus has contributed in reviewing this handbook.

The University Management is thankful to all the faculty members in providing their valuable contribution.

Dr Jawwad Ahmed Shamsi
Dean (Faculty of Computing)
October 2023

1. Glossary

FYP – BS Final Year Project

Student – A student registered for an **FYP** at NUCES

FYP Group – A group of students formed as a team to work on an **FYP**

Faculty – Permanent Computing faculty at NUCES

Supervisor – A person responsible for the supervision of an **FYP Group**. S/he is a NUCES **Faculty** member.

Faculty Panel – A subset of **Faculty** responsible for the evaluation of an **FYP.** External experts of the relevant area can also be included.

Panel Head – A member of **Faculty Panel** responsible for the supervision of the panel examination

FYP Committee – A committee of **Faculty** responsible for executing the FYP process

FYP Coordinators – Responsible for managing **FYP** registrations, evaluations, and results

2. The Role of FYP Coordinators

For the smooth conduct of the FYP process, the FYP coordinators carry out all the underlying supporting activities and provide the basic working platform for the execution of the FYPs.

The FYP committee works on different activities throughout an FYP lifecycle. Following is the detailed description of the roles and responsibilities of the FYP committee at different stages of the FYP process.

Step 1: Registration of FYP-1 Groups

The eligible students have to form FYP groups. A student who has completed 100 credit hours is eligible to register in FYP-1. As per current policy, an FYP group must consist of either 2 or 3 members. A group size of 3 members is preferable. More than 3 members and an individual student are not allowed to register in an FYP. The registration of an FYP group requires the students in the group to provide the following information to an FYP coordinator:

i. FYP title and a brief description of the FYP (1 or 2 paragraphs)
ii. FYP type (Development or R&D)
iii. Name of the Supervisor
iv. Information of the group members (names, roll numbers, CGPAs)
v. Any special hardware requirements
vi. UN SDG(s) targeted by the FYP
vii. Mapping of the algorithms and technologies from core courses used in the FYP
viii. Proof of registration on Flex (Print out from Flex)

The information is provided to an FYP coordinator using the FYP group registration form, which must be duly signed by the supervisor. The submitted forms are then processed by the FYP coordinators. They check the eligibility of the FYP-1 students

and the projects. A list of registered FYP-1's is produced by the end of the second week of a semester.

Note: The registration of an FYP group with the FYP coordinators is different from registering the FYP as a course on Flex. All students starting their FYPs must register first on Flex. In case an FYP is not registered on Flex, the student is debarred from registering his/her FYP with the FYP coordinators.

Step 2: FYP Proposal Defense

All members of an FYP group must appear before a faculty panel to present their FYP proposal. The FYP coordinators provide the format and duration of the presentations. For organizing the FYP proposal defense, the FYP coordinators perform the following tasks.

i. Formation of the faculty panels (on the basis of uniform distribution of the faculty expertise)
ii. Sharing the evaluation policy and guidelines with the students and faculty
iii. Scheduling of the FYP presentations
iv. Processing of the submitted forms and preparation of results
v. Providing faculty feedback to the FYP groups and supervisors
vi. Re-evaluation of the rejected FYPs (with new/revised ideas and same/new supervisors/groups)

Step 3: FYP-1 Mid-term Evaluation

FYP groups submit the mid semester FYP-1 report (in soft form) to the FYP committee and deliver a presentation along with the demonstration of the work in front of faculty panels as scheduled by the FYP coordinators. The development process of the FYPs follows iterative model. The FYP coordinators communicate the required deliverables of this presentation to the students.

For this evaluation, the FYP coordinators are responsible for the following sequence of activities:

i. Design and circulation of the presentation template and the evaluation guidelines to faculty and students;
ii. Formation of the faculty panels;
iii. Scheduling of the presentations;
iv. Processing of the submitted forms and the preparation of results; and
v. Sharing the faculty feedback to groups and supervisors.

Step 4: FYP Poster Evaluation

The FYP groups are required to create posters of their FYPs. The FYP coordinators are responsible for the following activities:

i. Collection of Posters from the FYP groups and verification of poster formats (manually done for every FYP group). The posters are accepted only after the approval from the supervisors;
ii. Printing of the posters and their display in university (coordination with the university printer);
iii. Evaluation of the Posters;
iv. Processing of the submitted forms and preparation of results; and
v. Dissemination of the faculty feedback to groups and supervisors.

Note: Poster evaluation may be merged (held in parallel) with the Mid-term evaluation.

Step 5: Final FYP-1 Evaluation

The FYP groups present the work completed as part of FYP-1. The FYP-1 report is submitted to the FYP committee in soft form after the approval of the supervisors. The faculty panels grade the reports along with the presentation. The FYP report that is not approved by the supervisor may be rejected.

The FYP coordinators are responsible for:

i. Circulation of the presentation template and the evaluation guidelines to faculty and students;

ii. Formation of the faculty panels;
iii. Scheduling of the presentations;
iv. Verification and vetting of the FYP reports;
v. Processing of the submitted forms and the preparation of results;
vi. Dissemination of the faculty feedback to groups and supervisors; and
vii. Preparation of the results (by applying an anomaly removal mechanism).

Step 6: Preparation of FYP-1 Grade

The FYP coordinators prepare the FYP-1 result. Every submission is verified and accepted only after the approval of the supervisor. For grading, the standard university policy is followed. As per current policy, the **minimum passing marks for an FYP student are 50%.** In case of substantial difference of group members' performance reported/ verified by the FYP Supervisor, group members will be assigned grades based on their individual performances.

Step 7: Execution of FYP–2

FYP-2 is centered on the "job fair" (previously called Open-House), where companies are invited to view the FYPs and to hold the interviews. The samples of the forms used for FYP-2 are given in the forms section. The FYP handbook contains the tasks to be completed by the students before the job fair evaluation.

Step 8-a: Pre-Job Fair Evaluation (FYP-2 Midterm Evaluation)

A purpose of the pre-job fair evaluation is to determine whether the projects are ready to be presented to the industry professionals. The pre-job fair evaluation is held in the 7th week of FYP-2. Only the projects that clear the pre-job fair evaluation (or re-evaluation) are allowed to participate in the job fair.

Projects that fail to appear in the job fair are penalized (up to 30% of FYP-2 marks).

The FYP Coordinators are responsible for:

i. Circulation of the presentation template and the evaluation guidelines to faculty and students;
ii. Formation of the faculty panels;
iii. Scheduling of the presentations;
iv. Approval of FYPs for appearing in the job fair; and
v. Managing the project displays in the job fair.

Step 8-b: Re-Evaluation of Rejected Projects

Full faculty panel (or multiple panels) evaluates the rejected FYPs for the final decision on acceptance/rejection of the FYPs for the job fair.

Step 9: Managing the Job Fair

The job fair is usually held around 12^{th}-14^{th} week of FYP-2. All FYPs that pass pre-job fair evaluation(s) appear in the job fair. The FYP coordinators are responsible for the display of FYPs on the day of the job fair and the overall management of the event. The FYP committee coordinates with the faculty member(s) responsible for the industrial liaison for inviting companies to the job fair. It provides an important opportunity for the graduating students to appear before the prospective employers. A large number of companies conduct interviews in the job fair.

The FYP coordinators are responsible for:

i. Finalizing the list of invited companies in coordination with the placement office;
ii. Printing of updated FYP-2 posters (in coordination with the Printer);
iii. Allocation/organization of FYP slots for job fair. Preparation of the event room/hall; and
iv. Floor coordination to ensure smooth running of the job fair.

Step 10: Final FYP-2 Evaluation

The final FYP-2 evaluations are held in the 15th week of the semester. The evaluations are conducted by the faculty panels. The FYP reports (submitted in soft form) are checked for plagiarism and then evaluated by the faculty panels along with the demonstration of the projects.

The FYP coordinators are responsible for:

i. Circulation of the presentation template and the evaluation guidelines to faculty and students;
ii. Formation of the faculty panels;
iii. Scheduling of the presentations;
iv. Verification and vetting of the FYP reports;
v. Processing of the submitted forms and the preparation of results;
vi. Dissemination of the faculty feedback to FYP groups supervisors; and
vii. Preparation of the results (by applying an anomaly removal mechanism).

Step 11: Final Deliverables and the Release of Grades

The FYP grades are released only upon receiving the final FYP report (in soft form) and other required documents (also in soft form). All reports must pass the plagiarism check specified by the university. The **Reports are accepted only after the approval of the supervisors**. In case of substantial difference of group members' performance reported/ verified by the FYP Supervisor, group members will be assigned grades based on their individual performances. The FYP coordinators are responsible for:

i. Processing of FYP-2 evaluations and grading;
ii. Receiving of FYP-2 reports;
iii. Vetting of FYP-2 reports; and
iv. Release of the grades based on the verification of the final deliverables.

In addition to the above-mentioned responsibilities, FYP coordinators also oversee the issues related to FYP lab (allocation of resources, resolving student complaints etc.). Similarly, the coordinators are also involved in any FYP-related purchase and act as the interface between the faculty and the IT department.

In summary, throughout FYP-1 and FYP-2, the FYP coordinators are responsible for:

i. Registration and maintenance of the records of FYP groups;
ii. Setting of the FYP evaluation policies;
iii. Scheduling and execution of the FYP evaluations;
iv. Processing of the evaluation forms and the preparation of results;
v. Conflict resolution among faculty members;
vi. Dissemination of the results and the faculty feedback;
vii. Verification of the FYP reports;
viii. Coordination of the equipment purchase for FYPs; and
ix. Overseeing the FYP lab.

The scope of the FYP committee does not cover:

1. Routine activities of monitoring and guiding the FYP groups (as it is a job of a supervisor). Similarly, the supervisors are responsible for tracking the weekly progress of the FYPs (on the prescribed forms);
2. Tracking of student attendance. This is a job of supervisors. Supervisors maintain the record of all meetings with students and provide the record to FYP coordinators at the end of a semester; and
3. Providing support such as computing and other facilities and monitoring student activities in the campus/labs. These are the jobs of the Labs and the department management.

3. The Role of a Supervisor

The role of a supervisor consists of:

1. Defining the scope of the project;
2. Guiding the students about the technical issues related to the project;
3. Monitoring the group's progress and assigning work to smoothly carry out the project;
4. Making sure that the students regularly work on their project. A Supervisor should keep track of the weekly tasks completed by every student. This attendance/task allocation list should be submitted to the FYP coordinators at the end of a semester;
5. Making sure that all the deadlines set by the FYP Committee are met on time;
6. Reporting the non-functioning of a team to the FYP Committee, so that a timely action is taken to avoid the unnecessary wastage of time. **Students can be referred to the Head, FAST School of Computing for debarring from an FYP in case of failure to meet minimum attendance criteria**. An FYP group is required to visit its supervisor for an FYP meeting at least once in a week;
7. Taking necessary action if an FYP group is not focusing on its work and rather it is spending most of the time on non-productive activities like playing games in the labs; and
8. Training students for team work, professional ethics, and presentations, etc. In particular, an FYP supervisor is responsible for ensuring that his/her group follows the iterative approach for the FYP.

4. Final Year Project Offering

The Final Year Project (FYP) is a compulsory requirement at undergraduate level. The students register in FYP-1 in 7th semester and on successfully completing FYP-1, they register in FYP-2 in 8th semester. The overall quality of the finished FYPs is a good representative of the quality of education imparted at the department. To ensure high quality FYPs, a rigorous process is followed at NUCES.

FYP ideas can be given by the faculty, the students, or experts from the industry. The faculty should offer the FYPs ideas well before the start of a semester. An FYP idea can be floated as one-page description in the following format:

1. Title of the project
2. Expected level of difficulty/effort involved
3. General narrative description of the idea/tasks - one or two paragraphs
4. References to a few resources such as books, book-chapters, papers, articles, technical reports, earlier project reports etc.
5. A list of expected deliverables or outcomes (if possible)
6. Any prerequisites or coursework for the project
7. Any special hardware requirement

These one-page descriptions are available for students to review. If they are interested in a certain project, they need to study the referred materials and seek appointment from the concerned faculty. The supervisor and the students can then agree to carry out the project. **The FYP Committee should approve the FYP proposals after the FYP proposal defense, as per recommendations of the panel(s).**

5. The Process

The students are required to register in the FYP-1 as a course on Flex. Once the students are registered on Flex, they become part of the FYP-1 process.

5.1 An Agile and Iterative FYP Process

The main goal is to move away from the lengthy requirements and the design process and adopt a more balanced approach, especially as there is no implementation in FYP-1. The students are required to perform the complete cycles of requirements to analysis and design followed by the implementation in both FYP-1 and FYP-2. FYP-1 and FYP-2 are divided into iterations.

5.2 FYP Iteration

Iteration is a unit of work. FYP-1 and FYP-2 are now composed of a number of iterations. The size and duration of an iteration are to be decided by the project supervisors.

In case of a development project, in every iteration, students pick a few use cases, expand and design them, followed by the implementation, before moving on to the next set of use cases. Students may use proxies and stubs where needed (for use case dependency). For every iteration, an FYP group should follow the standard analysis and design approach studied in the course work. Every iteration should result in a working product that can be demonstrated.

In case of an R&D-based project, in the first iteration, an FYP group designs the proposed mechanism/ heuristic/ algorithm/ protocol/ mathematical-model, etc. and in the remaining iterations, the group implements a part of the proposed mechanism/ heuristic/ algorithm/ protocol/ mathematical-model, etc. Excluding the first iteration, every remaining iteration should result in a working code that can be demonstrated.

Students should ideally complete 1-2 iterations in FYP-1 (all combining for around 45% of the Project work). Remaining iterations are completed in FYP-2, thus completing the FYP project.

A sample execution of FYP-1 is given in Table 1a. FYP-2 follows the same pattern as given in Table 1b.

Table 1a: FYP-1

S. #	**Deliverable/ Evaluation**	**Week #**	**Deliverable/ Presentation**
1	FYP Proposal Defense	2	Proposal Defense
2	FYP poster submission	7	Submission of Poster on SLATE
3	FYP Poster Evaluation	8	Posters are displayed in public area and are evaluated (can be done at the time of midterm evaluation)
4	Midterm Evaluation	8	FYP Report (version 1.0) Development Project Project Vision Research on related/ existing products Use Cases/ Use Case Diagram, SSD, SRS, Test Plan (Test Level, Testing Techniques), Software Development Plan, Wireframes, UI

S. #	**Deliverable/ Evaluation**	**Week #**	**Deliverable/ Presentation**
4	Midterm Evaluation	8	FYP Report (version 1.0) Development Project Project Vision Research on related/ existing products Use Cases/ Use Case Diagram, SSD, SRS, Test Plan (Test Level, Testing Techniques), Software Development Plan, Wireframes, UI Screens Iteration – 1 **Design Phase** (Select the design that is appropriate for your project): Structure Design: Domain Model/ Class Diagram, Component Diagram Layer Diagram Structure Chart Behavior Design: Flow Diagram, Data Flow Diagram (DFD), Data Dictionary, Activity Diagram, Network Automata/ Graphs or State Machine, Call Graph or Sequence Diagram,

S. #	Deliverable/ Evaluation	Week #	Deliverable/ Presentation
			Interaction Overview Diagram For DB Representation: Schema Design/ ER Diagram Data Structure Design Algorithm Design **Development Phase:** Comments, Naming Conventions, Static Analysis of Code, etc., Unit Test Suites or Test Cases **Maintenance Phase:** CI/ CD Deployment Diagram System-Level Test Suites, Test Cases (Validation and Testing) SVN or GitHub Configuration/ Setup and Tool Manual Working Code + Demonstration (for this iteration) **R&D-Based Project** Introduction (of the problem domain and the research problem) Literature Survey (of at least 5 most relevant

S. #	**Deliverable/ Evaluation**	**Week #**	**Deliverable/ Presentation**
			research items approved by the Supervisor) SRS (if applicable) Iteration – 1 Design of the proposed approach (framework/ heuristic/ algorithm/ protocol/ mathematical-model etc.). The approach is proposed either by a Supervisor or by the group (in consultation with the supervisor)
5	Final FYP-1 Evaluation	15	FYP Report (version 2.0) (with corrections) Adding Subsequent iterations (after the 1st iteration) Development project Working Code + Demonstration R&D-based Project Working code to demonstrate the implementation of a part of the proposed solution.

Any number of re-evaluations may be scheduled by the FYP Coordinator(s) as per the recommendations of the panel(s).

Table 1b: FYP-2

S. #	**Deliverable/ Evaluation**	**Week #**	**Deliverable/ Presentation**
1	FYP Pre – Job Fair Evaluation	7	Submission of the updated posters. Preparation of the demos (development FYPs). Preliminary results graphs/tables and the detailed discussion of the results (R&D-based FYPs). Submission of the updated Report.
2	FYP Pre – Job Fair (Re-evaluation)	9	Re-evaluation of FYPs that fail first evaluation
3	Job Fair	12 – 14	FYP Projects are displayed to industry professionals. Students prepare and submit their CVs, FYP descriptions, pictures, and posters to be included in the Graduate Directory.
4	Final FYP-2 Evaluation	15	Complete FYP Report duly signed by the Supervisor adding: Development FYP Package & Deployment Diagrams SVN or GitHub Google Play (for Android-based Mobile Applications)

S. #	**Deliverable/ Evaluation**	**Week #**	**Deliverable/ Presentation**
			Configuration/ Setup and Tool Manual Any other artifact deemed suitable by Supervisor Working Code + Demonstration R&D-based FYP Complete Results (Graphs/Tables), the detailed discussion of results, and conclusions Validation and Testing Working Code
5	FYP–2 Final Deliverables Submission	17	FYP report, FYP presentation, all codes, poster, any other documents etc. The report must be approved by the supervisor

FYP-1 Process

Step 1: Registration of FYP-1 Groups

During the semester break, faculty floats the proposals for the FYP through FYP coordinators. Students can also propose a project of their own, but faculty should formally approve the project. The students who are completing their degree in the next semester are eligible to register in FYP-1. This means that a student must have completed 100 credit hours prior to the registration. **The Head, FAST School of Computing, can allow relaxation of 1 course. Additional relaxation of a second course may be allowed by the campus Director.**

A **supervisor must be a full time faculty member** and may be assisted by an external supervisor. The students who are taking FYP from an industry/ outside are required to have an internal supervisor from the faculty and they need to submit a three page (maximum) FYP proposal (whose requirements have been mentioned above) to the internal supervisor. An R&D-based FYP must include substantial programming effort.

Once an FYP is registered, no change in FYP, group, or supervisor is allowed without the approval of the FYP committee. A sample registration form is attached in the forms section.

Step 2: FYP Proposal Defense

The FYP-1 proposal defense is held within the first 2 weeks of the start of a semester and is used for vetting an FYP idea. All groups are allocated presentation times and they must appear to present their FYP proposals. The FYP coordinators provide the format and duration of the presentations. The FYP coordinators may create "Faculty Panels" to evaluate the FYPs.

The faculty panels make decisions related to the approval, re-evaluation, or rejection of the FYPs. The FYP groups may be asked to modify their FYP scope, etc. In extreme case, a faculty

panel may even reject an FYP idea, requiring the students to re-register in another FYP.

The FYP coordinators are responsible for gathering all the evaluation forms and preparing the results. For every group, the feedback provided by the faculty panel is shared with the groups and their supervisors. To preserve confidentiality, the comments are separately compiled and are forwarded without the names of the evaluators.

The steps 1 and 2 must be completed in the first 2 weeks of the semester. At the end of the 2nd week, the FYP coordinators circulate the list of approved projects. Every project is assigned to a faculty panel.

The approved projects are then assigned resources in the FYP lab. The FYP coordinators and the IT manager collectively oversee this allocation.

Note: Requirements for any additional hardware or software must be clearly indicated to the FYP committee. An application duly approved by the supervisor must be submitted, containing the information such as availability and cost of the hardware/ software resource. **Please note that the campus is not obliged to provide the required hardware/ software resource and such requests are considered on a case-to-case basis.**

Step 3: FYP-1 Mid-Term Evaluation

The midterm evaluation is scheduled in the 8th week of a semester. The prime motivation behind this evaluation is to track the progress of the students and guide them in completing the remaining milestones. Hence, the primary focus of this evaluation is on the requirements and the design phase of FYP-1. FYP groups are required to submit the midterm report in soft form.

It is important to note that the number of use cases is not a measure for the quality of a project. The groups have to write as many use cases as possible to properly document the

requirements. For a development FYP that lacks user interactions, this number may be quite low. However, if the students have only 2-4 use cases (which is the case with some development FYPs), they should be prepared to explain what they have been spending their time on. Perhaps, they have done some implementation, studied some new algorithms, made comparisons, etc. In case of the development FYPs, the groups should have a working code to demonstrate the implemented iteration.

In case of the report of an R&D-based project, the students have to focus more on the introduction of the problem domain and the research problem along with the related work of at least 5 most relevant research items (book chapters, technical reports, conference or journal papers, magazine articles etc.). The research items must be chosen with the approval of the supervisor. The FYP group can include the works that are either completed or in progress in the selected area. It is considered important that the FYP group should clearly describe the comparison of the proposed approach (framework/ heuristic/ algorithm/ protocol/ mathematical-model) with the related works as well as the limitations of the proposed approach. The group can either devise the approach under the guidance of the supervisor or the approach may entirely be given by the supervisor. In both cases, the FYP group should include the approach in the report that is submitted for the midterm evaluation.

For the evaluations, every group is given around 10 minutes for the presentation. The students are required to present the major components of their midterm report along with the work distribution among them.

Note: The midterm evaluation form is attached at the end of the handbook.

Step 4: FYP Poster Evaluation

The FYP Poster evaluation is held in the 8th week of the semester

or at the time of the FYP-1 midterm evaluation. The Poster size should be 22.5" x 34.5". The posters are placed on open display and are evaluated by the Faculty panels.

Step 5: Final FYP-1 Evaluation

Till this stage, it is expected that the FYP groups should at least have accomplished 45% implementation of their projects. Students are expected to complete the iteration-2 deliverables (the exact number of iterations to be completed in FYP-1 depends on the supervisor, but it is recommended that there should at least be 2 iterations).

Every group submits the FYP-1 report and delivers a presentation and demonstration of the work done publicly in front of a faculty panel, as per the schedule announced by the FYP coordinators. The report should also include the plan of the work to be done in the next semester (for FYP-2). The detailed contents of the report are according to the requirements of an FYP and are decided by the supervisor and the group. The basic format and the guidelines for an FYP report is given at the end of this handbook. The report and the presentation are graded by the supervisor and the faculty panel**.**

Step 6. Preparation of FYP-1 Grade

The FYP coordinators prepare the FYP-1 result. The grades are released only after the submission of FYP-1 report (in soft form). Every submission is verified and it is accepted only after the approval of the supervisor.

The set of deliverables (described in Table 2 below) depends upon the nature of the project. Every deliverable is mandatory. However, for an exceptional case, an alternate can be defined in consultation with the supervisor and in intimation to the FYP coordinators (at least a week before the submission deadline).

Every submitted deliverable must include a supervisor's approval form duly signed by the supervisor. The submission

without the supervisor's approval form will not be entertained.

The late submissions are liable to get penalty as decided by the FYP committee. The students may get a zero for a late submission.

Table 2: List of Milestones for FYP-1

S. #	Description	Deadline
1	**Proposal Defense:** Team, Logo, Team/ Company Name and Supervisor(s), Project Title Problem Statement, Motivation, Expected Outcomes/ Use/ Impact of Software Type of Project: R&D/ Development Project Scope/ High Level Features Tools/ Technologies/ Environment **Artifacts**: FYP Proposal Document Presentation Slides	2nd week
2	**System Requirements Definition and Iteration Plan** System functions and features (Development FYP) Introduction and literature survey (R&D-based FYP) Submitted directly to Supervisor.	5th week

S. #	Description	Deadline
3	**Poster** The group prepares a Poster of size 22.5" x 34.5", which is placed on open display and is evaluated by the **Faculty Panels.**	7th week
4	**Mid Semester Evaluation** The **Group** submits a mid-semester report (in soft form) and delivers a presentation in front of a faculty panel	8th week
5	**Report submission and working code demonstration to supervisors** The requirements have been described above in Table 1a. Demonstration given to the supervisor	14th week
6	**Final Evaluation (Iterations amounting to 45% of the implementation work)** Report, and Presentations/ Demonstrations in front of a faculty panel.	15th week

Note

- Exact due dates are announced at the start of a semester.
- Supervisor/ teams should have their internal deadlines in order to meet the external deadlines.
- All groups must follow the iterative approach

FYP-2 Process

1. Those students who have passed FYP-1 register for the FYP-2 course on Flex and continue with their allotted FYPs.
2. The academic office provides the official list of registered students (in FYP-2) to the FYP coordinators.
3. The mid semester (pre-Job Fair) evaluation is held in the 8th week. Each group gives a demonstration of its FYP. The evaluation is done by the supervisor and the faculty panel.
4. The preparation for the job fair should be kept in mind as it is the earliest stage when recruitment process is initiated and it is possible to impress/ attract the companies by showcasing the students' capabilities. Hence, a working system should be ready by the 12th week. The FYP coordinators will notify in this regard giving a complete schedule of the event.
5. The final evaluation is held in the 15th week. A comprehensive FYP report (in soft form) is submitted before the presentation.
6. Each group submits the final FYP report (in soft form) and all other deliverables (also in soft form) in the 18th week to the FYP coordinators. The submitted report and deliverables should include the corrections and amendments proposed during the final evaluation.
7. The final report should follow the format specified by the university.

S. #	Description	Deadline
1	Iteration plan and implementation of the iterations (Development FYP) Remaining part of implementation of the proposed approach and performance evaluation (R&D-based FYP)	4th week
2	**Mid Semester/Pre-Job Fair Evaluation (1)**	7th week
3	Remaining iterations (Development FYP) or Preliminary results in graphs/Tables form (R&D-based FYP)	10th week

S. #	Description	Deadline
4	**Job Fair Evaluation (2)** Working System; Iteration deliverables (Development FYP) or Presentable results (R&D-based FYP)	10-12th week
5	**Final Presentation and Demonstration (3)**	15th week

8. **Deliverables**: The set of deliverables depends upon the nature of the project as follows:

9. **Final Deliverables**

   I. Report (soft copy of the final report and the complete power point FYP presentation).
   ii. Reference (reference material like articles, tool information etc.).
   iii. Code (complete source code of the project).
   iv. Application (It is strongly recommended that a web application-based FYP is hosted at an appropriate web-based platform. Similarly, for mobile application-based FYPs, either Android App Store or Apple App Store is recommended for hosting).
   v. Demonstration (the executable in working order and a readme file containing the information about the software requirements (tools) and hardware requirements for the FYP as well as the instructions or the steps (Soft copy of the User manual) for running the FYP executable).

Note

1. Exact due dates are announced at the start of a semester.
2. Supervisor/ teams should have their internal deadlines in order to meet the external deadlines

6. Evaluation

A recommended guideline for the composition of the grade is as follows:

FYP-1

Evaluation Items

Evaluation	Weight
Proposal Defense	10 %
Poster	40 %
Mid Semester	
Final	50 %

FYP-2

Evaluation Items

Evaluation	Weight
Pre-Job Fair	40 %
Final	60 %

Evaluators' Weights for both FYP-1 and FYP-2

Evaluation	Weight
Supervisor(s)	35-60 %
Faculty Panel (the entire panel is treated as examiner)	40-65 %

Compilation of Results

The evaluations submitted by a supervisor and the faculty panel are compiled and converted into a letter grade by the FYP Coordinators.

- The recommended distribution of marks between supervisor and faculty may change as per the range given in the above table.
- The letter grade is assigned after taking into account any deduction for the late submission of proposals, reports, failure in any evaluation, etc.

Miscellaneous Rules

The entire FYP process is designed to ensure that students are able to develop and deliver high quality FYPs. At the same time, the university has put in place rigorous rules to ensure fairness of the FYP process. Following additional rules apply:

1. Failing the FYP-1 proposal defense requires the group to re-submit a new/improved proposal. This can be done with the same supervisor or new supervisor.
2. Once an FYP idea has been registered with a given supervisor, the change of supervisor can only be done with the consent of the existing supervisor. Another option is to change the idea entirely and register with a new supervisor, giving up the previous idea.
3. FYP-1 and FYP-2 must be registered consecutively. There cannot be a frozen semester in between FYP-1 and FYP-2.
4. In case of receiving an "F" in FYP-1, the students must re-register in the FYP (same process as FYP-1). However, if they wish to change the supervisor, they must obtain permission from the supervisor through the supervisor change form. Another option is to drop the idea and register a new idea with a new supervisor. This only requires approval from the FYP Coordinators.
5. In case of receiving an "F" in FYP-2, the students cannot

change supervisor without the consent of the existing supervisor. FYP-2 must be re-registered as per normal practice. However, the idea cannot be changed at this stage as this may require re-doing the FYP-1 (FYP-1 and FYP-2 must be on the same idea). The Head, FAST School of Computing, in consultation with the FYP Coordinators may grant an exemption to this rule. The change of supervisor is allowed, but only through the explicit approval of the supervisor and the FYP coordinators.

6. In case the supervisor leaves the university, the FYP coordinators shall assign a new supervisor.
7. If case of the late submission of the final report (or submitting a report without supervisor's approval), the awarded grade may be converted to an "F", in line with the university policy.
8. Any student may be referred to the Head, FAST School of Computing, or the campus Director for missing the scheduled appointments with the Supervisor. Such students may be debarred from the final evaluation and be awarded an "F" grade on the recommendation of the supervisor and approval from the Head, FAST School of Computing. However, the supervisor must inform the FYP committee that the student is not coming to meetings and must issue a formal warning to the student.

7. Guidelines for the Preparation of FYP Poster

The FYP poster is a condensed representation of an FYP. It should be neat, attractive, and very inviting. Posters are evaluated by the faculty panel. The following is a list of recommended poster guidelines:

- Poster size must be 22.5" x 34.5".
- The orientation of the poster **should be Portrait**.
- Don't use too much text - just highlight your major points. Use bullets whenever possible.
- Make sure that the font is large enough for people to see it from a meter away.
- Illustrations and visualizations of concepts (maps, pictures, photos, design drawings, diagrams, tables, charts, graphs, "screen captures") look nice and can often say more than words.
- Make sure you spell check! (Also, note that capitalized words are often skipped by most spell checkers.)
- The top-left part may contain the title of the project, names of the group members and the Supervisor(s).
- The top-right part may contain the Project Goals.
- The bottom part may contain the Project Plan and the list of tentative deliverables for the final FYP-1 evaluation.
- While staying within these guidelines, there is plenty of scope for individual creativity through the use of different fonts, colors, backgrounds, and graphics.
- Do not include too much information. Too much text may obscure the main message of the poster. Limit the information to the key information, rely on answering questions, and on your project summary to get across the details.
- Use graphics where appropriate.
- The original Photoshop/Corel file of the poster should be submitted along with a jpeg image of the poster.

- Recommended tools for making poster are Adobe Photoshop or Corel Draw. If a group uses some other tool, he/she will be responsible for the printing of the Poster.

8. Guidelines for FYP Report Format

Title Page

The title page should include the title of the report along with the name(s) of the department or university/organization for which the report is written and the year of submission. Also included on the title page should be the name(s) of the author(s) of the report along with the name (s) of the supervisor (s). Title Page is followed by a blank page. A sample is shown below.

Final Year Project

(Title)

Producing Quality FYP (Subtitle)

FYP Team

Mr. ABCXYZ Mehboob

Supervised by

Mr. ABC

FAST School of Computing

National University of Computer and Emerging Sciences

[Campus], Pakistan

2023

Students' Submission

This includes the title of the report and its occasion.

_____

Anti-Plagiarism Declaration

This is to declare that the above FYP report produced under the:

Title:

_____

is the sole contribution of the author(s) and no part hereof has been reproduced on **as it is** basis (cut and paste) which can be considered as **Plagiarism.** All referenced parts have been used to argue the idea and have been cited properly. I/We will be responsible and liable for any consequence if violation of this declaration is determined.

Date: _____

Student 1 Name: _____

Signature:_____

Student 2 Name: _____

Signature:_____

Student 3 Name: _____

Signature:_____

Supervisor (Faculty) Name: _____

Signature:_____

Authors' Declaration

This states Authors' declaration that the work presented in the report is their own, and has not been submitted/presented previously to any other institution or organization.

Abstract (optional) (50 to 125 words)

Three to five sentences describing the essence of the work. An abstract is a short, 50-125 words summary of a work. An Abstract should state the purpose, findings, and conclusions of your work without commenting on or evaluating the work itself. Put the abstract on a separate page that follows the title page.

Acknowledgments (if any)

Executive Summary:

The executive summary should be one to two pages' overview of the information contained in the FYP report. It should give the reader an easy reference, in a very brief form, to the important information contained in the report and explained in more detail in the body of the report. People reading the report will use this section as a reference during presentations.

Table of Contents

The table of contents lists the information contained in the report in the order in which it will be found. All major topics of interest should be listed.

Introduction

The introduction should contain a brief overview of the problem being addressed and the background information needed for the reader to understand the work being done and the reasoning behind it. After reading the introduction, the reader should know exactly what the report is about, why the work was done, and how this work adds to the knowledge that the reader may have about the topic.

Body Chapters

Conclusions and/ or Recommendations

Present a summary of what you found in the results section. Here you should describe the techniques that you used for each analysis and the results of each analysis.

Conclusions are broad generalizations that focus on addressing the questions to answer which the project was undertaken. Recommendations are your choices for strategies or tactics based on your conclusions. Quite often authors are tempted to speculate on outcomes that cannot be supported by the findings. Do not draw any conclusions or make any recommendations that your work cannot clearly support.

References

This section should list all existing information sources used in the FYP. It is important to allow the reader to see all of the sources used and enable the reader to further explore these sources to verify the information presented.

Appendix/ces

This section should include all supporting information from the project that was not included in the body of the report. You should include surveys, complex statistical calculations, certain detailed tables, and other such information in an appendix. The information presented in this section is important to support the work presented in the body of the report but would make it more difficult to read and understand the work if presented within the body of the report. Appendixes may include maps, graphs, charts, or other helpful material.

Cite the appendix items in the report narrative (write "see Appendix A") and organize appendices (e.g., Appendix A, Appendix B, etc.)

Any tables, figures, form, or other materials that are not totally central to the analysis but that need to be shown are placed in the Appendix.

Footnotes/ End Notes

Footnotes are located at the bottom of a page. End notes are like footnotes but are located at the back rather than the bottom of each page. These would include all of the references for all works cited in the review of related literature or any other sections of the report as well as the references for quotations, either direct or indirect, taken from other sources, or any footnote comments that might have been included. These are listed in numeric order as presented in the text.

1. Lani Arredondo (1999) Business Presentations, McGraw-Hill, pp. 23-34.
2. Jann Schill (1996) On Purpose, Heinemann, Australia, p. 23.
3. Paul Tench (1981) Pronunciation Skills, Macmillan, p. 23.

In case an endnote is followed by another citing the same source, only the word: "Ibid" (as above) shall substitute for the entire text. If the page no. is different, then the page number shall appear after the word: "Ibid". For example:

1. Jann Schill (1996) On Purpose, Heinemann, Australia, p. 23.
   Ibid., p. 54.

In case the same source comes to be mentioned after a few interrupting sources, then the word "op cit" would suffice (mentioned earlier is written), followed by the page number.

Bibliography or Literature Cited

Bibliography will appear in alphabetic order of the authors' surnames. Author's surname shall come first as is the case in the catalogues of libraries.

Arredondo, Lani (1999) Business Presentations, McGraw-Hill.
Schill, Jann (1996) On Purpose, Heinemann, Australia.

Tench, Paul (1981) Pronunciation Skills, Macmillan.

Note: Use underlining (italics) for titles of books, periodicals newspapers, works of art, ships, etc. Articles or chapters in books, periodicals, or journals shall come in double quotes.

Paper

Standard A4 size
Width: 8.27"
Height: 11.69"
Weight: 90 Grams

Fonts, Type Styles

Font Size = 11 (Normal Text)
Font = Times New Roman
Title= 26 bold (Times New Roman)
Sub-title=20 bold (Times New Roman)
Heading 1 (Font Size) = 16 (Bold)
Font = Arial
Heading 2 (Font Size) = 14 (Bold)
Font = Arial
Heading 3 (Font Size) = 13 (Bold, Italics)
Font = Arial

Margins

Top = 1.5"
Bottom = 1.0"
Left = 2.0"
Right = 1.0"

Spacing

Line Spacing = 1.5
Paragraph Spacing = 6 pts

Indentation

Indent all quotations comprising 4 or more lines by 5 spaces from left.

Page Numbers

Except for the title page, number all pages which come before the first page of the body chapters consecutively with lower case roman numerals (i, ii, iii, iv,…).

The first page with Arabic numeral (1, 2, 3, and so on) starts from the page of the introduction but it is mentioned from page 2 onwards.

Mention page numbers on the top right of the page. The first page of each section or chapter will not carry the page number; however, the page number will be counted for the proceeding page.

Headers

The header will comprise the title of the Project report. On every odd page will appear the title of the report while on the even pages the title of the chapter or section will be mentioned. The first page of every section or chapter shall not carry the header.

9. FYP Report Contents

There are two types of FYPs – R&D and development. Therefore, the basic contents for the two types of reports are given below as a guideline. A specific and tailored format according to an FYP's need is suggested by a supervisor.

Development FYP Report Format

1. Introduction
2. Research on existing products
3. Project Vision
    - 3.1. Problem Statement
    - 3.2. Business Opportunity
    - 3.3. Objectives
    - 3.4. Project Scope
    - 3.5. Constraints
    - 3.6. Stakeholders Description
        - 3.6.1. Stakeholders Summary
        - 3.6.2. Key High Level Goals and Problems of Stakeholders
4. Software Requirement Specifications
    - 4.1. List of Features
    - 4.2. Functional Requirements
    - 4.3. Non-Functional Requirements
5. Iteration Plan
6. Iteration 1 (all artifacts mentioned in Table 1a)
7. Iteration 2 (all artifacts mentioned in Table 1a)
   and so on … (for subsequent iterations)
8. Implementation Details (not the programming code but the algorithmic and procedural details especially related to the hidden/ backend algorithms that are not covered in the design)
9. User Manual

References
Appendices

R&D-Based FYP Report Format

Chapter 1. Introduction
- 1.1. Problem Domain
- 1.2. Research Problem Statement
- 1.3. Software Requirements Specification (if applicable)

Chapter 2. Literature Review
- 2.1. Research Item # 1
  - 2.1.1. Summary of the research item (1 or 2 paragraphs)
  - 2.1.2. Critical analysis of the research item (Strengths and Weaknesses)
  - 2.1.3. Relationship to the proposed research work
- 2.2. Research Item # 2
  - 2.2.1. Summary of the research item (1 or 2 paragraphs)
  - 2.2.2. Critical analysis of the research item (Strengths and Weaknesses)
  - 2.2.3. Relationship to the proposed research work
- 2.3. Research Item # 3
  - 2.3.1. Summary of the research item (1 or 2 paragraphs)
  - 2.3.2. Critical analysis of the research item (Strengths and Weaknesses)
  - 2.3.3. Relationship to the proposed research work
- 2.4. Research Item # 4
  - 2.4.1. Summary of the research item (1 or 2 paragraphs)
  - 2.4.2. Critical analysis of the research item (Strengths and Weaknesses)
  - 2.4.3. Relationship to the proposed research work

2.5. Research Item # 5
- 2.5.1. Summary of the research item (1 or 2 paragraphs)
- 2.5.2. Critical analysis of the research item (Strengths and Weaknesses)
- 2.5.3. Relationship to the proposed research work

Chapter 3. Proposed Approach (Framework/ Heuristic/ Algorithm/ Protocol/ Mathematical-model)

Chapter 4. Implementation (Simulations or Experiments)

Chapter 5. Validation and Testing

Chapter 6. Results and Discussion

Chapter 7. Conclusions and Future Work

References

Appendices

10. FYP Forms

National University
of Computer & Emerging Sciences, [Campus]

FYP Registration Form

FYP Title:

FYP Type (Development or R&D-based):
Brief Description

UN SDGs targeted by the FYP:

FYP (Algorithms and knowledge used from Core Courses):

Course Name (Limit of up to 10 courses)	Core ideas used in FYP

Group Members:

Roll #	Name	Cell #	CGPA	E-mail Address

External Supervisor (if any):

Name _____

Organization _____

Name of Faculty Supervisor

_____

Supervisor's Signature _____ Dated_____

National University
of Computer & Emerging Sciences, [Campus]

FYP Proposal Defense Evaluation Form

Title of FYP:

_____

Group Members:

Sr #	Roll #	Name

About Evaluator:

Name and Signature:

_____

Your role in this evaluation: **(please tick one)**

Supervisor	
Panel Member	

Evaluation: (please tick one)

Approved	
Approved with Minor Modifications	
Approved with Major Modifications	
Rejected	

*** Modifications (Minor/Major) Recommended (if any)**

_____

*** Reason for Rejection (mandatory, if any FYP is rejected)**

_____

National University
of Computer & Emerging Sciences, [Campus]

FYP-1 Mid-Semester Evaluation Form

Title of FYP:

_____

Group Members:

_____

About Evaluator:

Name and Signature:

_____

Your role in this evaluation: **(please tick one)**

Supervisor	
Panel Member	

Evaluation:
(A= Excellent, B=Good, C=Satisfactory, D=Not Satisfactory, F=Not Accepted*)
(Dev = Development FYP, R&D = R&D-based FYP)

Criteria			Tick one in each row				
	%		A	B	C	D	F*
Iteration definition, FYP Plan, Work breakdown (What is to be covered in the iteration)	10						
Presentation (Contents, Style, Confidence, Dress)	20						
FYP Report (Artifacts / Features)	Dev	40					
Work Completed (as per iteration plan)		30					
FYP Report Introduction of problem domain and research problem statement, SRS (if applicable), Literature survey of at least 5 research items, Proposed approach	R&D	70					

*** Justify in case of ticking "Not Accepted". Any other comments/suggestions!**

National University
of Computer & Emerging Sciences, [Campus]

FYP-1 Final Evaluation Form

Title of FYP:

_____

Group Members:

_____

About Evaluator:

Name and Signature:

_____

Your role in this evaluation: **(please tick one)**

Supervisor	
Panel Member	

Evaluation:
(A= Excellent, B=Good, C=Satisfactory, D=Not Satisfactory, F=Not Accepted*)
(Dev = Development FYP, R&D = R&D-based FYP)

Criteria			Tick one in each row				
	%		A	B	C	D	F*
Iteration definition, FYP Plan, Work breakdown	**5**						
Presentation (Contents, Style, Confidence, Dress)	**15**						
FYP Report (Artifacts / Features)	**Dev**	**25**					
Demonstration of the code (Quality, Conformance with design, User interface etc.)		**30**					
FYP Report (Introduction of problem domain and research problem statement, SRS (if applicable), Literature survey of at least 5 research items, Proposed approach, experimental	**R&D**	**55**					

*** Justify in case of ticking "Not Accepted". Any other comments/suggestions!**

National University
of Computer & Emerging Sciences, [Campus]

FYP-2 Pre-Job Fair (Midterm) Evaluation Form

Title of FYP:

_____

Group Members:

_____

About Evaluator:

Name and Signature:

_____

Your role in this evaluation: **(please tick one)**

Supervisor	
Panel Member	

Evaluation:
(A= Excellent, B=Good, C=Satisfactory, D=Not Satisfactory, F=Not Accepted*)
(Dev = Development FYP, R&D = R&D-based FYP)

Criteria			Tick one in each row				
	%		A	B	C	D	F*
Work completed (Implementation)		**30**					
Work suitable for the Job Fair (Interface, Functionality, Demonstration)	**Dev**	**30**					
Code quality (conformance with design, plagiarism issues, good coding practices)		**20**					
Level of code integration (Are all components / modules fully integrated?)		**20**					
Preliminary Results (in the form of graphs / tables)	**R&D**	**40**					
Work suitable for the Job Fair		**30**					

Criteria			Tick one in each row				
	%		A	B	C	D	F*
(Results of the performance evaluation in presentable form clearing depicting the outcomes of the research)							

*** Justify in case of ticking "Not Accepted". Any other comments/suggestions!**

_____

National University
of Computer & Emerging Sciences, [Campus]

FYP-2 Final Evaluation Form

Title of FYP:

_____

Group Members:

_____

About Evaluator:

Name and Signature:

_____

Your role in this evaluation: **(please tick one)**

Supervisor	
Panel Member	

Evaluation:
(A= Excellent, B=Good, C=Satisfactory, D=Not Satisfactory, F=Not Accepted*)
(Dev = Development FYP, R&D = R&D-based FYP)

Criteria			Tick one in each row				
	%		A	B	C	D	F*
Work completed (Implementation)		**30**					
Work suitable for the Job Fair (Interface, Functionality, Demonstration)	**Dev**	**30**					
Code quality (conformance with design, plagiarism issues, good coding practices)		**20**					
Level of code integration (Are all components / modules fully integrated?)		**20**					
Preliminary Results (in the form of graphs / tables)	**R&D**	**40**					
Work suitable for the Job Fair		**30**					

(all previous requirements, plus complete performance evaluation results along with an appropriate discussion on the results, validation and testing)	**R&D**						
Quality of the research **(Usefulness of the results, whether the contribution is good for publishing etc.)**		**30**					

*** Comments on the FYP (Mandatory)!**

National University
of Computer & Emerging Sciences, [Campus]

FYP Tracking/Monitoring Form
(For Supervisors)

Title of FYP:

_____

Students:_____ **Semester:**_____

Period from:_____ To: _____

Date	Work Completed	Work Assigned	Target Date

Supervisor:_____

Signature:_____

NATIONAL UNIVERSITY
of Computer & Emerging Sciences

Chiniot - Faisalabad
Loonaywala Stop
(9 Km from Motorway Interchange)
Faisalabad-Chiniot Road
Tel: (041) 111-128-128

Islamabad
A.K. Brohi Road, H-11/4
Tel: (051) 111-128-128

Karachi
Shah Latif Town (on National Highway)
Tel: (021) 111-128-128

Lahore
Block-B, Faisal Town
Tel: (042) 111-128-128

Peshawar
160 Industrial Estate, Hayatabad
Tel: (091) 111-128-128

for further query, please contact
regsitrar@nu.edu.pk

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