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**CSE 303 & CSE 303l**

Database Management Project

Report 01

## **Group 01:**

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# **Chapter 1 – Introduction:**

The Independent University Bangladesh (IUB) has robust and versatile schools - notably consisting following:

* Business & Entrepreneurship
* Engineering, Technology & Sciences
* Environment and Life Sciences
* Liberal Arts & Social Sciences
* Pharmacy and Public Health.

The university has been an active participant in the growth of the education sector in Bangladesh and produced capable and knowledgeable scholars contributing both here and abroad. [1]

IUB has achieved this through working closely with relevant government education institutions and organizations such as the University Grants Commission (UGC), Ministry of Education, and other necessary institutes for each of the schools, regularly updating its curriculums and putting in a system to monitor student performance based on a quantified approach between course curriculum and standards set by UGC and the Bangladesh government and constantly tracking student performance for every semester – mainly, using Outcome-Based Education (OBE) for monitoring performance and setting university curriculum. [1]

The focus of this report is to study the current student performance monitoring system that IUB uses, do the required analysis of its processes and propose a new and better improved system that reduces error, makes analysis of data and report generation easier by all vested quarters and produce/show valuable information needed for IUB and its collaborators in making necessary improvements in academia to produce better scholars. The first part focuses on the details of the organization in question and the project that we have undertaken for it. The second part focuses on the existing system and its shortcomings and an introduction of the proposed system that we plan to replace the existing system with. The third and fourth will be heavily technical and focus on how we plan to bring the proposed system into being.

During our research into the existing system for student performance monitoring we have found many areas where valuable changes could be made to make each process of monitoring student performance faster, make communication between necessary stakeholders easier, take away chances for errors and data duplication, and most importantly make it easier for all stakeholders to easily surf through large datasets to get meaningful information to their requirement .

As we go through this report, we will dig deeper into how the current student performance monitoring system operates, the business processes involved, where there are concerns and issues related to data management, and how we can make a better system to address these issues for fixing and improvement.

**A. Background of the Organization- IUB:**

Independent University – Bangladesh (IUB), established in 1993, is one of the oldest private universities in Bangladesh, currently has more than an estimation of 7,048 undergraduate and graduate students and over 10,455 alumni. This student population is mostly predicted to grow at 10% annually. [2]

IUB, over-time, has shown remarkable outcomes in producing graduates with marketable skills only because of staying disciplined and up to date with the on-going curriculum and progress system. Dedicating attention towards IUb’s School of Engineering and Computer Science, and more specifically focusing the Department of Computer Science and Electrical science into a well-funded research hub running several research projects. IUB is also committed to curve potential graduates of international standard who are mainly equipped to provide new leadership to the national economy through skilled employment, entrepreneurship and/or applied research. This is successful due to the overwhelming support of the Bangladesh Government and the UGC for IUB to be able to create state-of-the-art lab facilities in their department. It is because of IUB’s approach to academics as an “Application Oriented Learning” philosophy that “not only teaches students the fundamental principles of learning, situation -handling, and have better overall perception by providing them with hands-on training sessions.” [3]

Continuously growing it’s lab facilities and flourishing on its curriculum according to current market economic demands, the SECS and the Department of Computer Science and Engineering at IUB has constantly worked with IEB, UGC and the Ministry of Education to track their students’ overall performance under specific periods by quantifying specific courses and its relating assessments into measurable trackers to gain valuable insights for improvement of students over the years as a student in a certain department.

These processes and criteria credentials courses are ultimately set by IEB along with relevant government potentials to set the bar for up-coming graduating engineers from top universities in Bangladesh. These set of standards come in the form of Program Educational Objectives (PEO) and Program Learning Outcomes (PLO) [1] for specific departments in an Accreditation Manual which are mapped to specific courses by relevant Course Instructors and Co-ordinators. This allows the Department of CSE at IUB, SECS, IEB and all other relevant stakeholders to have a calculating assessment of the current state-of-affairs and the performance of each student under each course for every semester. This will also allow users to track performance of faculties, courses, departments and schools and provides valuable insight for making necessary improvements.

**B. Background of the Project SPMS 2.0:**Measuring the output of students, faculties, departments and their respective courses in order to measure their productivity in regards to the outcome relevance of the course activities. Basically to provide a range of tools and data intended to help universities and education authorities such as IEB, UGC, as well as other stakeholders to evaluate the performance of students and inform strategies for improvements. Developing a national framework for Outcome-Based Education while at the same time leaving considerable freedom to universities in implementing local approaches.

**C. Objective of the Project SPMS 2.0:**The **SPMS 2.0** system monitors and summarizes the performances of the stakeholders - students, faculties, schools and departments through the database of the assessments. For evaluation purposes the system would be able to store individual assessment marks (midterm, quizzes, assignment, projects, presentations and so on). As well as the marks of those assessments with respect to their Course Outcomes (CO) and Program Learning Outcomes (PLO) accordingly in the database of the system, in order to observe the outcome and performance of the students faculties, schools and departments.  
  
The students being the primary stakeholder, would be able to statistically directly monitor the overall performance to their satisfaction of certain course objectives. Hence based on their performances and faculty evaluation the higher stakeholders (Head of department and Admin) can understand and manage the degree in comparison to which different course outcomes targets and their achievements are being understood by the student, department, school and university body as a whole. **SPSMS 2.0** also monitors the impact of policies against overall administrative goals and targets by the system. The system’s main target is to monitor the whole university activities through the database and produce analytics for the Head of Department, Faculty, School, Students and their Courses in a given period of time (yearly and semester wise).

## **D. Scope of the Project:** We did a complete analysis of the existing system and found out places in the business processes which can cause severe lapses in time and communication, which we will discuss in the next chapter.

Our solution is to create a Web application, called **SPMS 2.0** (Student Performance Monitoring System 2.0), using a Relational Database Management System (RDMS) to store, edit, add, and update necessary data for monitoring student performance and producing and storing related OBE data, reports, and documents.

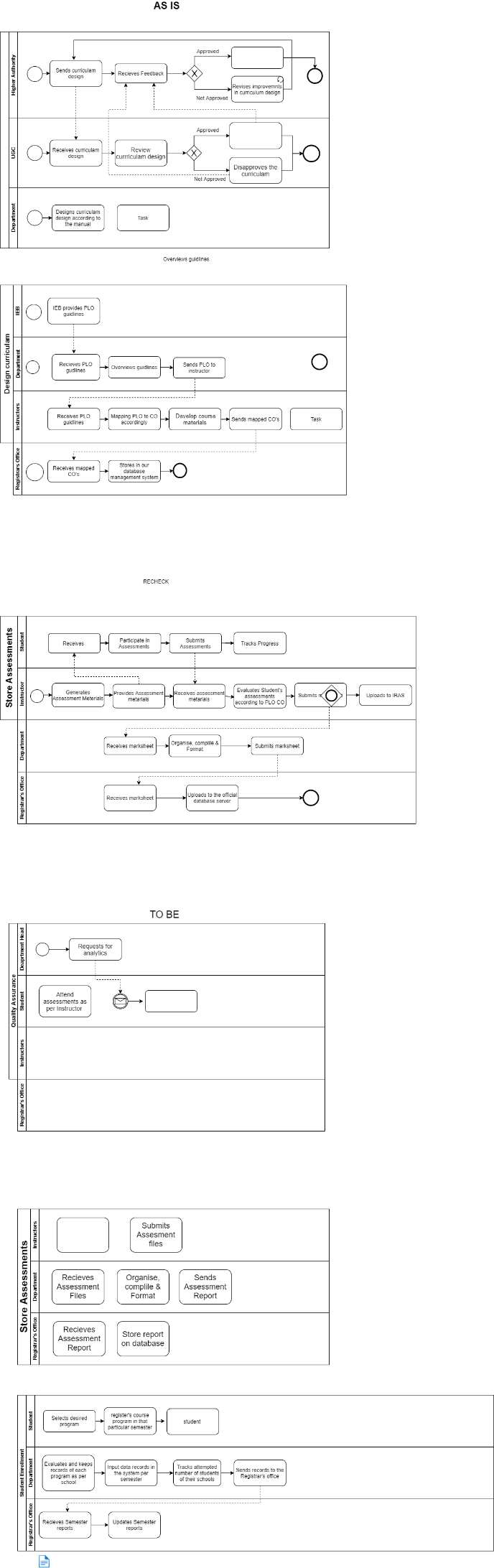
We produced potential users for the web based **SPMS 2.0** system and speculated how they would be using the system and the necessary information and data they would need access to. Since the problems can arise from many points of all business processes, we will make custom user interfaces and login capabilities for all stakeholders who will also be the users of this system.

Since we use a (RDBMS) for data storage, retrieving necessary files, tabular data, page layouts and reports becomes incredibly easy and allows us to interact with the necessary data to occur real-time. We also create interfaces for all users to easily access these data and use them to generate and download reports.

We build an interface for faculties to be able to collaborate with each other on developing course outlines, course reports, mark sheets, assessments, mapping assessments to CO’s and PLO’s for PLO achievements, and record assessments of students throughout the semester for all their courses.

Students, the IUB leadership team and government agencies can also access the systems for drawing conclusions.

Data will also be protected and each stakeholder will be shown only that data which is relevant to them respectively.



# **B.Processes along with six system elements:**

|  |  |  |  |  |  |  |
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| **Process** | **System Roles** | | | | | |
| **Human** | **Non- computing Hardware** | **Computing Hardware** | **Software** | **Database** | **Communication/ Network** |
| **Design curriculum** | **Instructor**  a) Set question  papers for  examinations  according to  mapped COs.  b) Invigilate  examinations  and collect  assessment.  c) Develop course materials  d) Assess optimum mapping COs to PLOs  e) Send CO’s to the Registrar's office for records progress.  f) Provides marksheet to the department | **Hard copy**  Pen, paper, whiteboard  **Spreadsheets**  A collection of all marks (data) of respective assessments. | **Computer**  a) Used by  faculties to  access the  COs from the  Excel sheet.  b) Faculties  may also use it  to take online  examinations  and interact  with students.  c) Students  may use it to  attend online  Examinations.  **Mobile Phone**  a) Some  examinations  may allow  mobile phones  for scanning  and uploading  pdfs to virtual  Examinations.  **Printer**  a) Used by  faculties to  print out  question  papers for  Students.  **Networking**  **devices**  **(Router,**  **Switch,**  **Bridge, Hub)** | **Microsoft**  **Office**  a) The software  from which the  faculty will  collect COs.  Google  Classroom  a) Used by  faculties and  students during  Examinations.  **Operating**  **System**  a) Any OS used  by the users,  e.g. Windows,  Mac.  Printing  Software  **PDF viewer**  a) To view  questions in  PDF or send  the answer in PDF | **Microsoft**  **Excel**  **Database**  a) Faculty  access COs  from this. | **Email**  a) Written discussion between stakeholders, designers, faculty, and higher management.  b) Share draft documents between each other.  **WiFi**  a) Used for connectivity between users and the existing system while at the university.  **Internet**  a) Used for connectivity between users and the existing system while away from the university. |
| **Student Assessment** | **Student :**  a) Attend  examinations  and submit  attempted test  papers to faculty via physical or digital methods by deadline. | **Classroom :**  a) At present classes are taken in classrooms properly. | **Computer/ Laptop :**  Used by respective faculties and students in the lab to attend classes and lectures to their respective courses.  **Projector :**  For class lectures, quizzes, presentations and so on.  **Speakers :**  For auditoriums, lectures and conducting examinations. | **Microsoft Word/Excel**  a) Used to keep student’s assessment marks and grades. For example mid term paper, quiz,finals etc.  **Operating**  **System :**  a) Any OS used  by the users,  e.g. Windows,  Mac, Ubuntu. | **Microsoft**  **Excel**  **Database**  a) Faculty  Evaluate and create a report of COs as per student’s assessment. |  |
| **Performance based Quality Assurance** | **Higher Management :**  a)Monitoring student performance  b) Obtain course marksheets from faculty and student attendance data from attendance system (IRAS)  c) Identify performances of the students  d)Identify quality performances of faculty  e) Monitoring faculty performance  f) Collect faculty evaluations during the evaluation period from students. | **Spreadsheet**  a) Used to keep student’s assessments. For example mid term paper, quiz,finals etc.  **Assessment scripts**  a) Used to evaluate students and faculty evaluation  **Pen and paper :**  a) Used by faculty and higher management to brainstorm and design course content. | **Computer**  a) Used by  Higher managements to  access the  COs from the  Excel sheet.  b) Faculties  may also use it  to collect and evaluate assessments..  c) Students  may use it to  evaluate faculty.  **Photocopy machines**  a) Accumulating progresses per time period in hardcopies for offline storage and tracking. | **Operating**  **System :**  a) Any OS used  by the users,  e.g. Windows,  Mac, Ubuntu. |  |  |
| **Accounts management** | **Admin:**  Creates/edits student accounts when enrolled  **Student:**  Enrolls into a program and their respective courses.  **Faculty:**  A course is assigned to them according to their sections. | **Pen and paper**  a) Used by the Registrar's office providing forms in hard copies. | **Computer**  a) Used by  Registrar's office and admin to  access the  COs from the  Excel sheet.  b) Faculties  may also use to assign their respective course sections as per semesters wise. | **Operating**  **System :**  a) Any OS used  by the users,  e.g. Windows,  Mac, Ubuntu. | **Microsoft Word/Excel**  a) Used to keep student’s assessment marks and grades. For example mid term paper, quiz,finals etc. | **Email**  a) Written discussion between stakeholders, designers, faculty, and higher management.  b) Store documents in IRAS.  **WiFi:**  a) Used for connectivity between users and the existing system while at the university.  **Internet**  a) Used for connectivity between users and the existing system via LAN network connections. |
| **UGC based regulations** | **Higher**  **Management**  **(HM)**  a) Sends the  Curriculum  booklet  to UGC.  b) If it gets  approved by  the UGC then  the HM  publishes the  Curriculum  booklet.  c) If it doesn’t  get approved  the HM sets  the Curriculum  according to  the demands  of the UGC.  d) HM Sends  the Updated  Curriculum to  the  Department.  **UGC:**  a) Receives the  Curriculum  booklet from  the HM.  b) Reviews the  booklet if it  requires  changes it  sends back  feedback to  the HM  regarding the  changes as  needed else it  is approved by the UGC | **Pen, paper and manual book.**  a) Used by the UGC to approve along with appropriate documentation. | **Computer:**  a)To generate & evaluation as per the university curriculum design.  **Mobile Phones:**  a)To communicate on the net and keep updates. | **Operating**  **System :**  a) Any OS used  by the users,  e.g. Windows,  Mac, Ubuntu, Android. |  | **Email**  a) Written discussion between stakeholders, Higher Management.  **WiFi**  a) Used for connectivity between users and the existing system.  **Internet**  a) Used for connectivity between users and the existing system via LAN network connections. |
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**Problem Analysis**

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| **Process Name** | **Stakeholders** | **Concerns(Problems)** | **Analysis (Reason of the Problems)** | **Proposed Solution** |
| Student Enrollment | 1.Student  2. Registrar Office  3. Department Head | School-wise, department-wise and program-wise student enrollment comparison. | Student enrollment and other information are not counted in the system . | We want to keep the in the count of students enrolled school-wise, department-wise and program-wise and make it transparent semester-wise |
| Performance trend according to GPA and CGPA | 1.Student  2.Teachers  3.Department-Head  4. VC | 1.School-wise, department-wise and program-wise student performance trends  based on CGPA with respect to a given period of time/semesters.  2.Course-wise (for a selection of courses) student performance trend based on GPA  with respect to a given period of time/semesters. | GPA and CGPA need to be calculated by the teachers manually . | We want keep the data and create a graph of GPA and CGPA and it gets easier to evaluate and analyze in a glance |
| PLO and CO achieved and attempted | 1.Student  2.Instructor  3.Department  4.School | 1. Student-wise, Instructor wise department wise, Department, School-wise PLO and CO analysis were absent and transparent. | PLO and CO are not calculated or analyzed | PLO and Co will be calculated and made transparent for analysis and comparison semester wise/time period. |