

CUSTOMIZATION OF GENERIC SELECTION SOFTWARE AND AUTO GENERATION OF REPORTS

Abstract

Teaching pedagogy has undergone a revolutionary change over the years. Programme Educational Outcomes, Programme Specific Outcomes, Course Outcomes and Programme Outcomes define the Outcome Based Education (OBE) System in which the learning outcomes for different courses are pre-defined and the academic curriculum and content delivery is planned to meet those objectives. The academic curriculum supporting OBE is Choice Based Credit System (CBCS) in which the whole curriculum is segregated into different components targeting the holistic development of a learner. One of the components is Generic Elective course which enables the learner to select a course beyond the academic curriculum and the one offered by an external department. Currently, the selection is restricted to institute level. A learner can select any course offered by another department, other than the department in which the admission is sought. Since the activity is carried out at institute level, some sort of planning and automated computerized system is desirable to avoid any sort of chaos and confusion among the students. Due to the limited availability of human resource a seating of 120 is declared for each GE course and the selection is on first come first serve basis. The authors have designed and developed a web based generic course selection software for the purpose which is operational for the last several years. As the curriculum undergoes a modification either structurally or content wise, as GE and class coordinators change, rules evolve, the software requires some sort of customization to incorporate the changes. Further, different reports are to be generated for GE coordinators, class coordinators and consolidated reports. As of now, the report

Authors

Dr. P.G.Naik

Department of Computer Studies
CSIBER,
Kolhapur, India.

Dr. G.R.Naik

Department of Mechanical Engineering,
KIT's College of Engineering,
Kolhapur, India.

generation was carried out manually which is a time consuming process. To account for this the authors have automated the report generation process by implementing the relevant APIs in business logic tier. The reports are exported by the system in Excel format.

Keywords: Application Programming Interface, Choice Based Credit System, Generic Elective, Software Customization, Outcome Based Education, Ability Enhancement Course.

I. INTRODUCTION

A Generic Elective (GE) is an inter-disciplinary course under Choice Based Credit System (CBCS). CBCS pattern focuses on the holistic development of the learners. Apart from the depth on core courses, skill based education is imparted through Discipline Specific Elective (DSE), Ability Enhancement Courses (AEC) and Ability Enhancement Core Courses (AECC). This course is provided to students to allow them to gain a chance at availing a comprehensive education. An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure to other discipline/subject. The Generic Elective has equal credit as that of core paper. A core course offered in a discipline/subject may be treated as an elective by another discipline/subject. The student has to study one GE in each semester of the Programme. The Institute offers GE Selection based on First-Come-First-Serve basis.

1. Departments in CSIBER and Different Programmes Launched by Various Departments

Currently CSIBER has five distinct departments listed below:

- Department of Commerce and Management
- Department of Computer Studies
- Economics Department
- Environment Management
- Social Work Department

Total 12 programmes are run by the above five departments:

- MCA
- MSc (CS)
- M.Sc.(CS in Cyber Security)
- MBA (General)
- MBA (BA)
- MBA (BFS)
- MBA (Environment Management)
- MSc (Environment and Safety)
- MSW
- MA (Counselling and Guidance)
- MSc (QE)
- MCom

2. Scope of the System:

- The proposed system should incorporate the following functionalities:
 - The system should be operable by end users of diverse roles and responsibilities.
 - The system should be flexible enough to incorporate the new roles on the need basis.
- In the current system, the following roles are identified:
 - Admin
 - Director

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- G.E. Coordinator
 - Class Coordinator
 - Student
- The system should maintain a logical relationship between the following entities:
 - Programme, Year, Semester, G.E. Subjects
 - Student Registration, G.E. Selection
 - The system should avoid duplication of registration process.
 - The system should avoid duplication of GE selection process.
 - The system should keep track of live count of students for each GE subject at the time of GE selection process
 - Allocation process of specific GE subject should stop, when student count reaches to maximum capacity
 - The system should operate for both mobile and Desktop/Laptop
 - The system should take care of the following tasks as depicted in the following table:

Task	Description
Transaction control	The atomic transactions in different logical transactions should be committed or rolled back as a single unit.
Concurrency Control	Proper locking mechanism should be in place to avoid data inconsistency.
Role based authentication	The task should be accessible and should be performed only by the person who is authorized to do so.
Time triggered menu options.	The menu options should dynamically appear and persist for the specified period of time.

- To generate the required informative reports. The system should generate the requisite reports for Director, GE coordinator, Class coordinator. The list of reports along with the roles permitted to access it is shown below:
 - GE coordinator Registration Report (Director)
 - Class coordinator Registration Report (Director)
 - Student Registration Report (Director, Class coordinator)
 - Programme-wise GE Allocation Report (Director, Class coordinator)
 - Programme-wise GE Non-Allocation Report (Director, Class coordinator)
 - Subject-wise GE Allocation Report (Director, GE coordinator)
 - Subject -wise GE Non-Allocation Report (Director, GE coordinator)

3. System Objectives

- To develop Online System for GE selection.
- To maintain transparency in GE selection process.
- To reduce human intervention in the process.

4. Relevance to Professional or Academic Field

Generic Elective (GE) gives exposure to a new discipline/subject and prepare them to look for interdisciplinary research

5. Tools and Techniques Employed

Different tools and techniques employed in the implementation of the model are listed below:

- The proposed system will be implemented employing an open source technology in a cost-effective manner using PHP and MySQL
- XAMPP stack will be utilized for execution of Apache server hosting web app and MySQL server hosting the database.
- The system will be hosted on an internet server, so that student can go through the registration and selection process from anywhere.
- Advanced web technology employed in the system development include
 - AJAX for improving application performance
 - Query for improving User Interface and User Experience.
- The project employs bootstrap technology to handle devices of disparate display sizes.

6. System Testing

The system should be tested

- For different browsers, Mozilla and Chrome in particular, due to their highest market share.
- For different display sizes.
- For Concurrency
- Allocation process of specific GE subject should stop, when student count reaches to maximum capacity
- Proper validation mechanism should be in place in order to reduce runtime errors, if any.

7. Research Approach or Methodology

The different modules employed in the project are listed below:

- Department Master
- Programme Master Module
- Student Master Module
- Registration Module
- User Authentication Module
- Class coordinator
- GE coordinator
- Generic Electives Module
- Generic Allocation Module

8. Expected Outcomes:

- Student should be able to successfully register with the system.
- Student should be able to get access to syllabi of different generic elective subjects offered by other departments.
- Student should be able to select only the generic elective subjects offered by other departments.
- Class coordinator should be able to view the list of registered students of the class.
- GE coordinator should be able to view the list of students of different departments who have opted the GE subject.
- The GE selection link should be activated only in the specified period of time.
- At the time of GE selection, the availability status of different GE subjects should be

visually displayed to a student.

II. CONCEPTUAL SYSTEM DESIGN

1. Module Dependency Diagram

The dependencies existing between different modules is shown Figure 1.

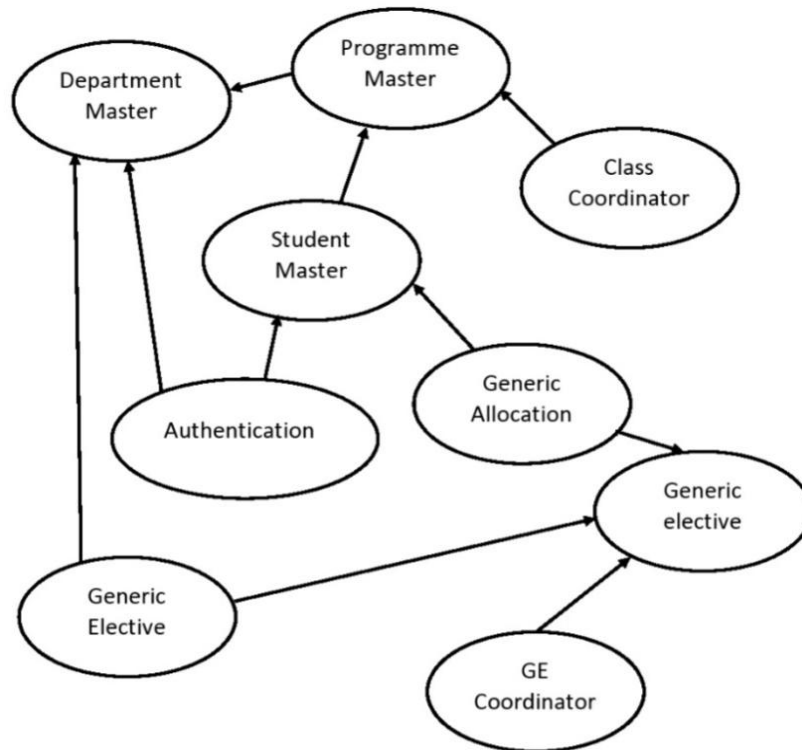


Figure 1: Dependency between Different Modules of the GE Software

- 2. Application Architecture:** The prototype model given above will be implemented in PHP with MySQL as backend. The multi-tier application architecture employed is shown in Figure 2(a) & 2(b)

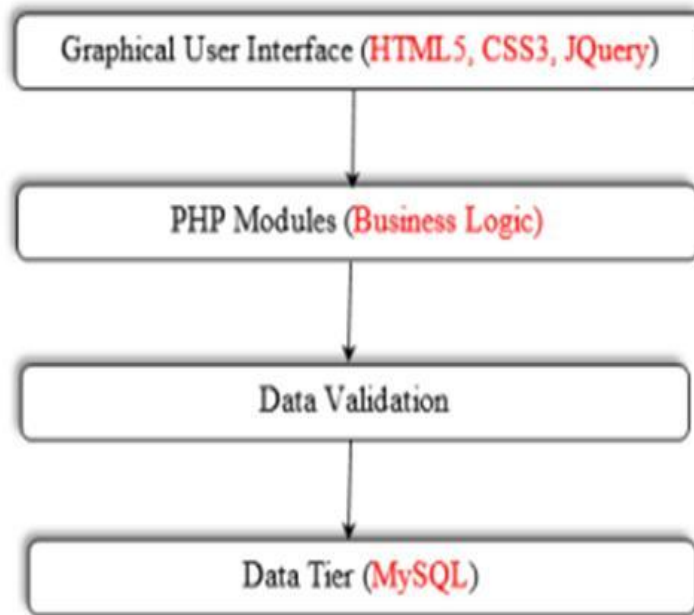


Figure 2: Multi-Tier Application Architecture.

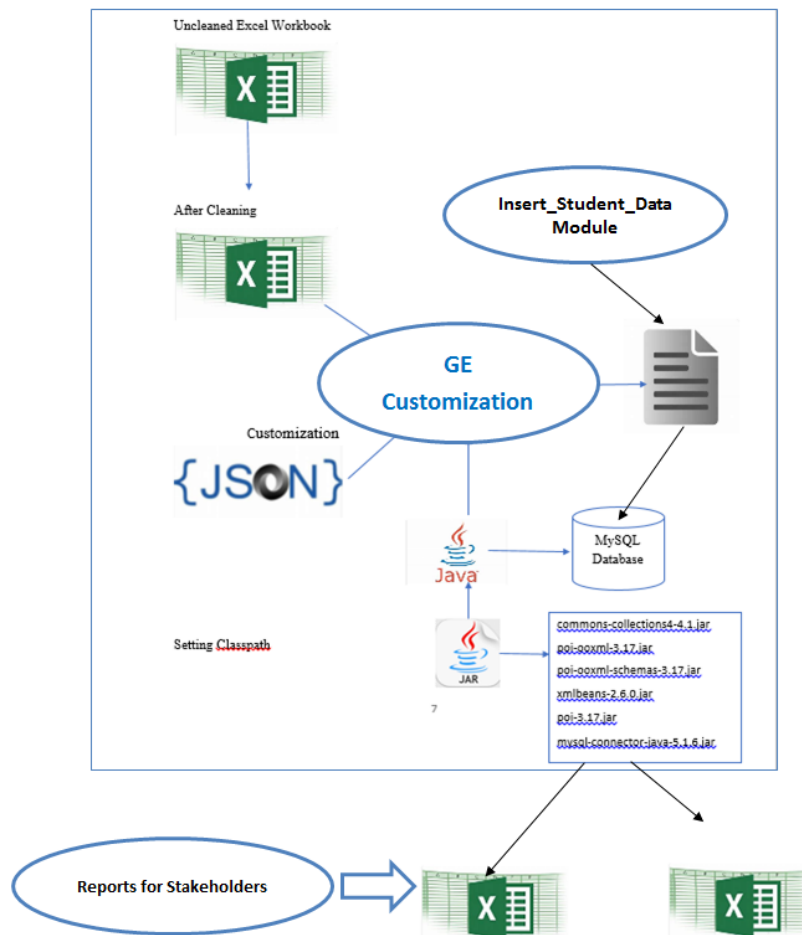


Figure 3: Multi-Layered Application Architecture.

3. Use Case Diagram: The dynamic behaviour of the system is depicted in the form of a use case diagram in Figure 3 comprising of the following actors:

- Admin
- Director
- GE Coordinator
- Class Coordinator
- Student

The various functionalities and the tasks performed by different actors is summarized in Figure 4.

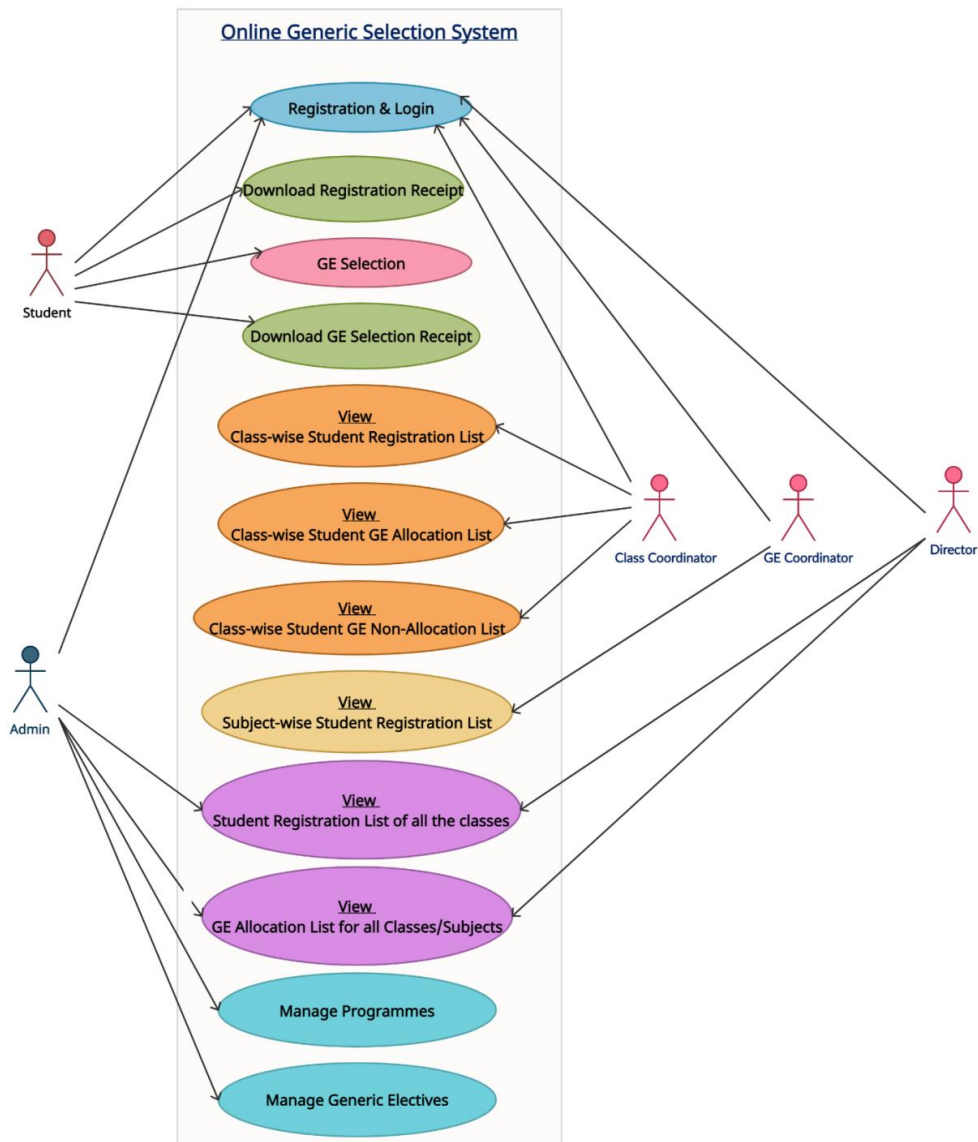


Figure 4: Use Case Diagram

4. Generic Database Structure

The structure of ‘Generic’ database is depicted in Figure 5.

Table	Action
<input type="checkbox"/> ge_coordinator_master	★ Browse Structure Search Insert Empty Drop
<input type="checkbox"/> program_master	★ Browse Structure Search Insert Empty Drop
<input type="checkbox"/> student_master	★ Browse Structure Search Insert Empty Drop
3 tables	Sum

Figure 5: Structure of ‘Generic’ Database

The structure of different tables present in ‘Generic’ database is shown in Figure 6.

#	Name	Type	Collation
<input type="checkbox"/> 1	dept_name	char(100)	latin1_swedish_ci
<input type="checkbox"/> 2	ge_coordinator_name	char(100)	latin1_swedish_ci
<input type="checkbox"/> 3	ge_subject_name	char(100)	latin1_swedish_ci

#	Name	Type	Collation
<input type="checkbox"/> 1	dept_name	char(100)	latin1_swedish_ci
<input type="checkbox"/> 2	prog_name	char(100)	latin1_swedish_ci
<input type="checkbox"/> 3	class_coordinator	char(100)	latin1_swedish_ci

#	Name	Type	Collation
<input type="checkbox"/> 1	rollno	int(11)	
<input type="checkbox"/> 2	name	char(100)	latin1_swedish_ci
<input type="checkbox"/> 3	prog_name	char(100)	latin1_swedish_ci
<input type="checkbox"/> 4	ge_dept_name	char(100)	latin1_swedish_ci

Figure 6: Structure of Tables in ‘Generic’ Database

Table Creation Commands

```
create database generic;

use generic;

create table student_master(rollno int, name char(100), prog_name char(100), ge_dept_name
char(100));

create table program_master(dept_name char(100), prog_name char(100));

insert into program_master values('Department of Computer Studies', 'MCA');

insert into program_master values('Department of Computer Studies', 'MSc (CS)');

insert into program_master values('Department of Computer Studies', 'MSc (CS in Cyber
Security)');

create table ge_coordinator_master(dept_name char(100), ge_coordinator_name char(100));

insert into ge_coordinator_master values('Department of Computer Studies', 'Sneh Nagaokar');

insert into ge_coordinator_master values('Department of Commerce and Management', 'Viraj
Jadhav');

insert into ge_coordinator_master values('Economics Department', 'Kishor Kumar');
```

III. LITERATURE REVIEW

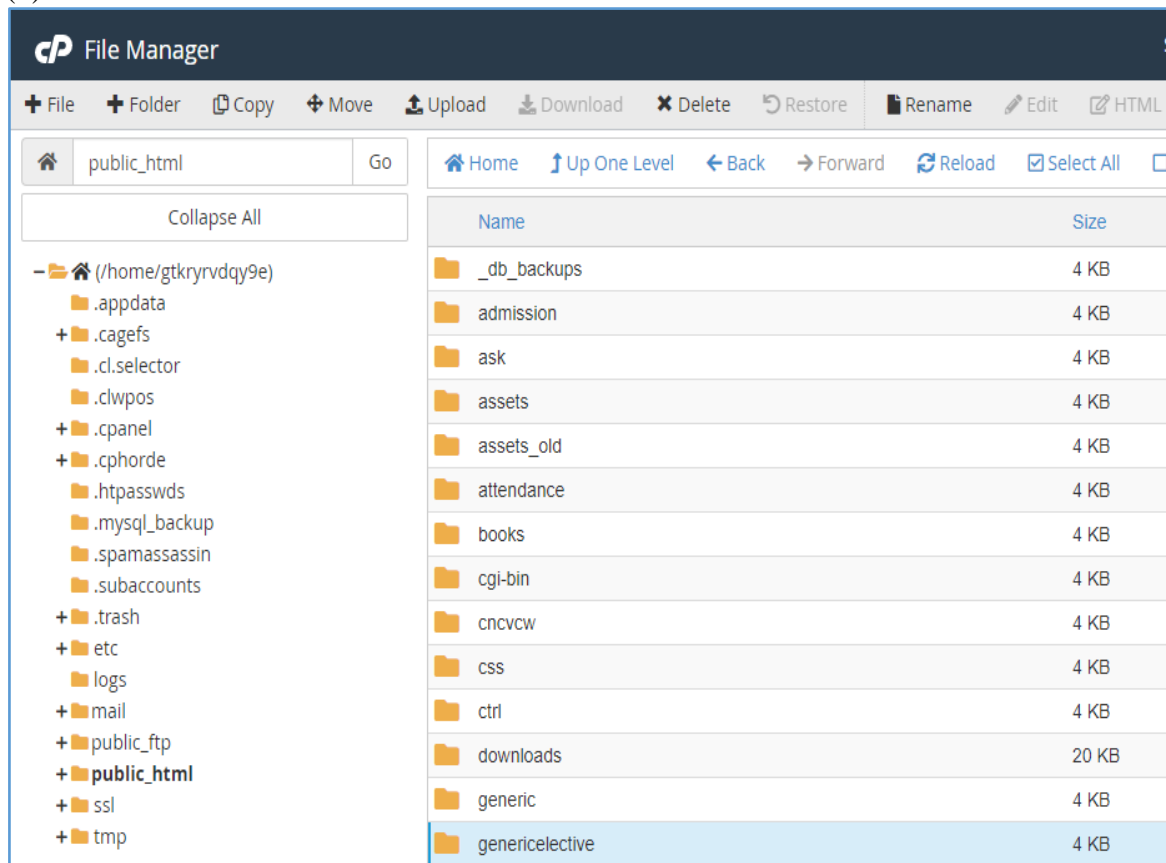
There is exhaustive work and a plethora of research papers on the analytical study and the implications of CBCS on higher education system. An exhaustive analytical study has been performed on the CBCS system focusing on its objective to eliminate rote learning and memorization leading to an innovative education system (Saharish 2009, Kelkar et.al. 2014, Biswas 2018, Saha 2021). Although CBCS sounds elegant on paper there are several obstacles to its practical implementation of CBCS. The problems and prospects of implementing CBCS at the UG level are highlighted by Tanmoy Saha (Saha 2021). More attention and discussion are required for the problems and prospects of CBCS to fulfil its objectives. To cater to the needs of ease in course selection, the current paper provides guidelines for the design and implementation of a generic web-based system for course selection which is generic and can be applied to any course category. Zhang et.al. have carried out a comprehensive study to examine the availability of OBE in Guangdong Ocean University. Their empirical study has proofed the teaching pedagogy based on Obasim E indeed facilitates the melioration in communication skills of undergraduates (Zhang 2019), Asim et.al. have carried out a comprehensive review to address the major factors that impact student learning outcomes. Their study suggested five important factors from the literature that impact student learning outcomes including, assessment strategies, learning objectives based on level of complexity, student preferred learning styles, English language competency and Employer requirements (Asim 2020). To achieve the goals of OBE the guidelines are provided by six knowledge levels of Bloom's taxonomy, Programme Educational Outcomes, Programme Specific Outcomes, Course Outcomes and Programme outcomes. To gain the











attributes detailed for outcome based totally schooling via NBA right overview techniques are required, due to the fact assessment of the graduate attributes plays a key position in coaching gaining knowledge of system to enhance the device and to improve the overall performance of college students. (Devasis P 2021, Nazeer 2021).

1. Generic Elective Software Customization

- **Generic Elective Software Folder Structure on Server**

The structure of Generic Elective micro site on Go Daddy server is shown in Figures 7(a) – 7(d).



Name	Size
 bootstrap	4 KB
 css	4 KB
 docs	4 KB
 fonts	4 KB
 img	4 KB
 js	4 KB
 genericelective.zip	6.28 MB
 index.html	75.67 KB
 index_temp	76.72 KB
 License.txt	1.94 KB











cP File Manager Se

+ File + Folder ↶ Copy ↷ Move ⬆ Upload ⬇ Download ✕ Delete ↶ Restore 🏷 Rename ✎ Edit 🔗 HTML Ed

🏠 public_html/genericelective Go
🏠 Home
↑ Up One Level
← Back
→ Forward
↻ Reload
 Select All
 U

Collapse All

- 📁 🏠 (/home/gtkryrvdqy9e)
 - 📁 .appdata
 - + 📁 .cagefs
 - 📁 .cl.selector
 - 📁 .clwpos
 - + 📁 .cpanel
 - + 📁 .cphorde
 - 📁 .htpasswd
 - 📁 .mysql_backup
 - 📁 .spamassassin
 - 📁 .subaccounts
 - + 📁 .trash
 - + 📁 etc
 - 📁 logs

Name	Size
 bootstrap	4 KB
 css	4 KB
 docs	4 KB
 fonts	4 KB
 img	4 KB
 js	4 KB
 genericelective.zip	6.28 MB
 index.html	75.67 KB
 index_temp	76.72 KB
 License.txt	1.94 KB

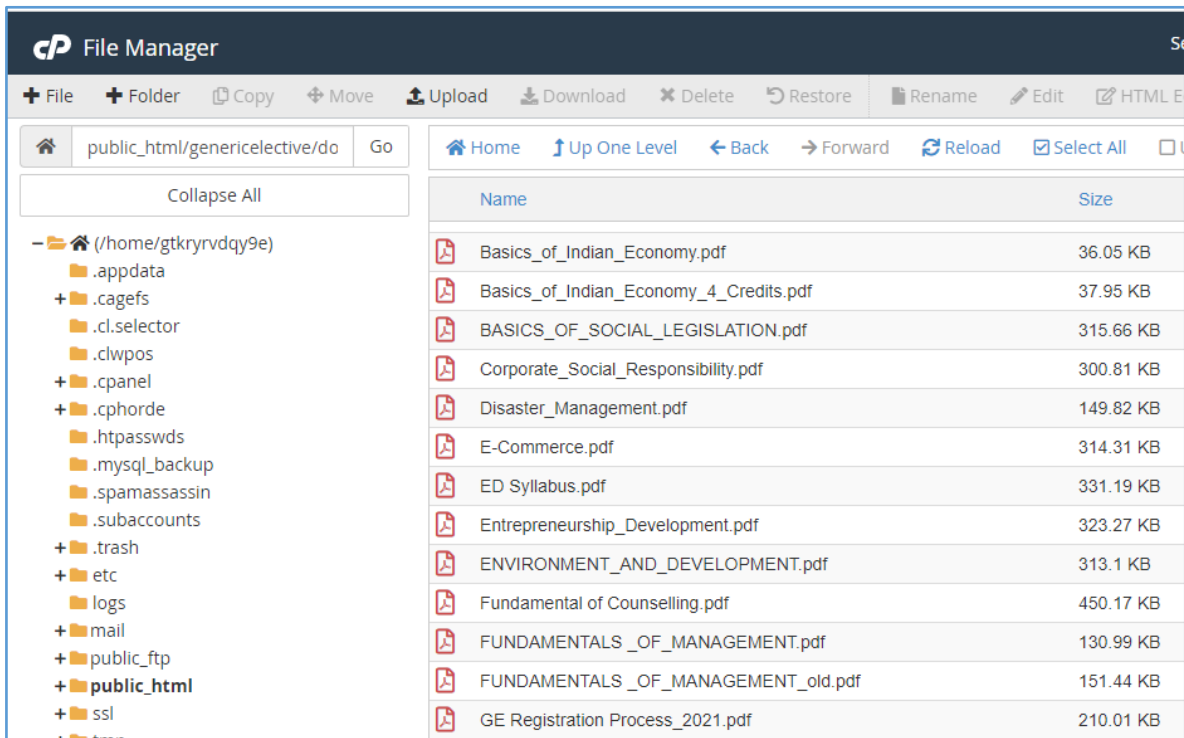
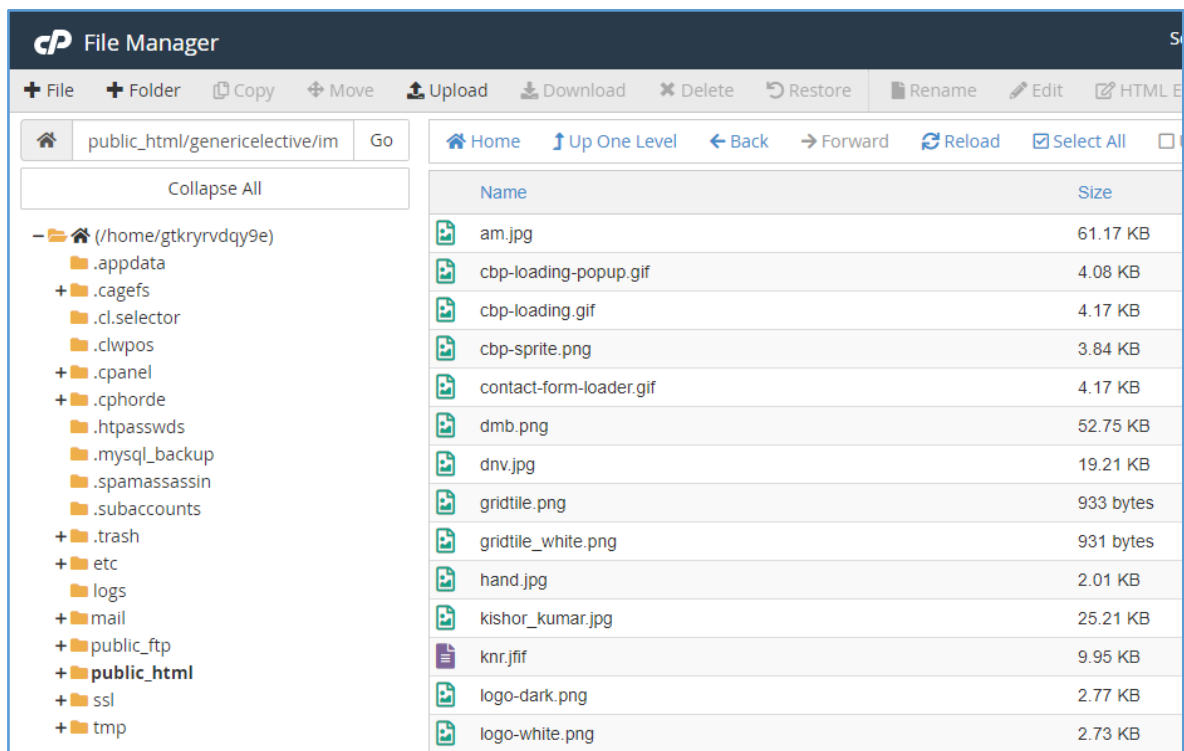
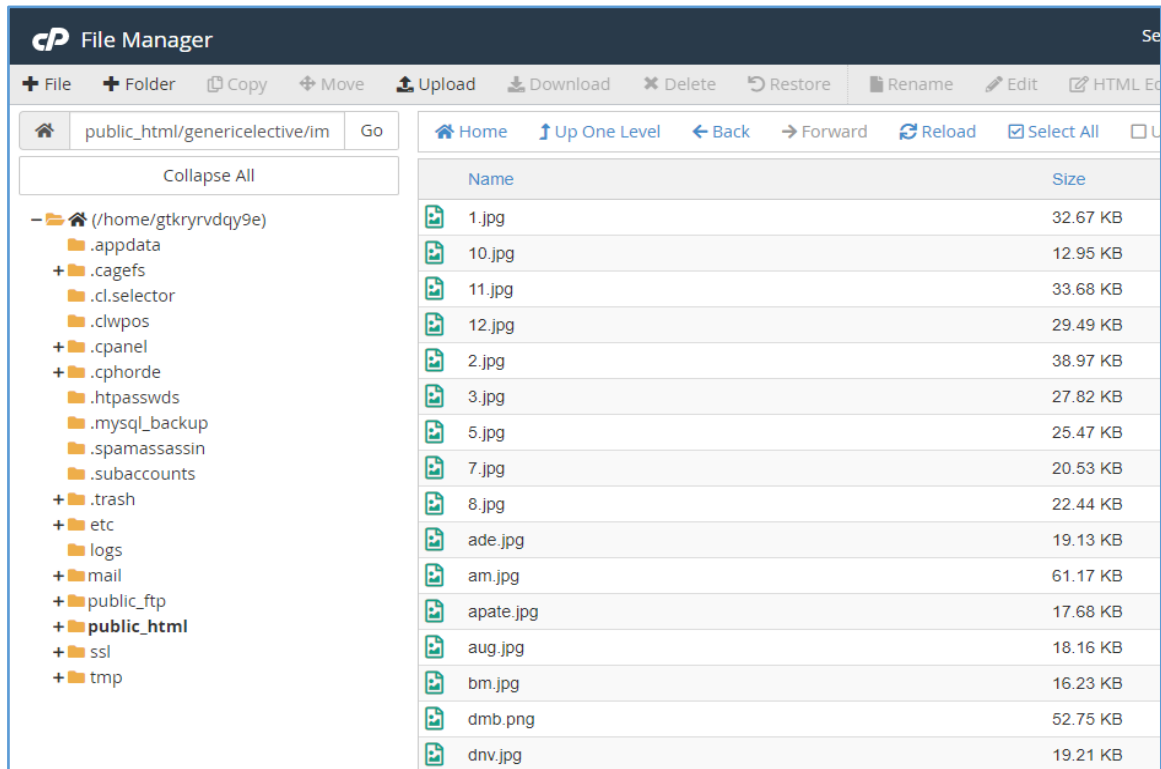


Figure 7(a) – 7(d): Generic Elective Software Folder Structure on Server

genericselective/img/assets Folder Structure



/img/portfolio/fullsize Folder Structure

- 2. Files Used in the Project:** As a precautionary measure towards application's efficiency, the execution load is properly distributed between the client and the server. The GE course selection process is performed on the server side while the report generation logic is delegated to the client. The different files used in the project are depicted in Table 1.

Table 1: Different Files Used in GE Software Project.

Sr. No	File Name	Tier	Location	Description
1.	index.html	Presentation	/genericselective (Server)	Home Page
2.	*.pdf	Presentation	/genericselective/docs (Server)	Generic Elective Syllabi of five departments.
3.	*.jpg	Presentation	/genericselective/img/assets (Server)	
4.	InsertStudentData.java	Business Logic	d:/genericselective/ (Client)	Parsing Excel file and inserting student information in MySQL database
5.	WriteGECordinatorReport.java	Business Logic	d:/genericselective/ (Client)	Generates GE Coordinator reports and exports as Excel workbooks in 'ge_coordinator_reports' folder.

6.	WriteClassCoordinatorReport.java	Business Logic	d:/genericelective/ (Client)	Generates Class Coordinator reports and exports as Excel workbook with the name 'class_coordinator_consolidated_report.xls'.
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3. Customizing index.html

Uploading the GE Course Syllabi on Server.

The current syllabi of GE courses offered by different departments are uploaded in the /genericelective/docs folder in PDF format and are available on the home page for reference as shown in Figure 8.

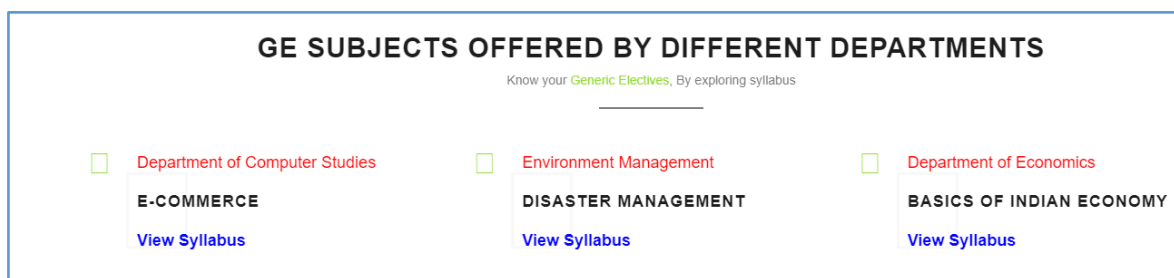


Figure 8: GE Course Syllabi Displayed on the Home Page for Reference.

The customization of index.html page for inserting the link to GE course syllabus is shown below:

```

297
298 <!-- Start Features Section -->
299 <section id="features">
300 <div class="container">
301 <div class="col-md-12 text-center wow fadeInUp">
302 <h3 class="section-title">GE Subjects Offered By Different Departments</h3>
303 <p class="subheading">Know your<span class="highlight"> Generic Electives</span>, By exploring syllabus</p>
304 </div>
305 <div class="row features-row wow fadeInUp">
306 <div class="col-md-4 col-sm-12 feature-column">
307 <div class="feature-icon">
308 <i class="icon-eyeglasses size-2x highlight"></i>
309 <i class="icon-eyeglasses back-icon"></i>
310 </div>
311 <div class="feature-info">
312 <font color='red' size=4>Department of Computer Studies</font><br><br>
313 <h4>E-COMMERCE </h4>
314 <h3><a href="docs/E-Commerce.pdf"><font color="Blue" size="4">View Syllabus</font></a></h3>

```

The next section consists of links to the important documents pertaining to GE user manual and document containing GE selection guidelines as shown in Figure 9.

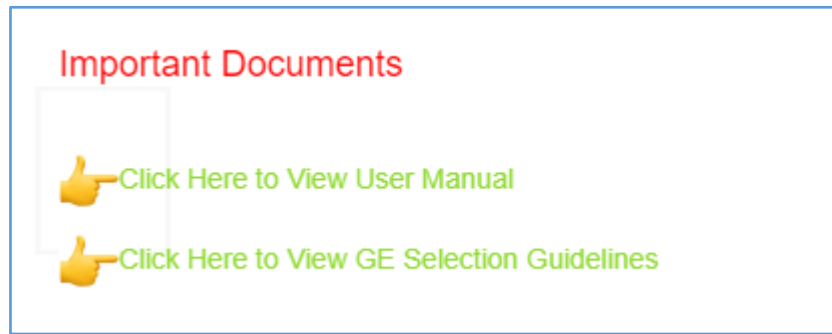


Figure 9: Links to Important Documents

The customization of index.html page for inserting the link to important documents displayed above is shown below:

```
387 </h4></h4>
388 <p class="feature-description"> </img><a href="docs/GE_Selection(User Manual).pdf">Click Here to View User Manual</a></p>
389 <p class="feature-description"> </img><a href="docs/GE_Selection_Process_2023_Sem-III.pdf">Click Here to View GE Selection
390 </div>
```

The next section contains the slide showing the names of the GE elective courses offered by different departments along with the cut-off info.

Generic Electives	
E-COMMERCE	120
ENTREPRENEURSHIP DEVELOPMENT	120
BASICS OF INDIAN ECONOMY	120
CORPORATE SOCIAL RESPONSIBILITY	120
DISASTER MANAGEMENT	120

The structure of Google form for GE course selection along with its settings is shown in Figure 9(a) – 9(b).

Department of Computer Studies (E-Commerce)

Form description

Email *

Valid email

This form is collecting emails. [Change settings](#)

Roll No. :

Short answer

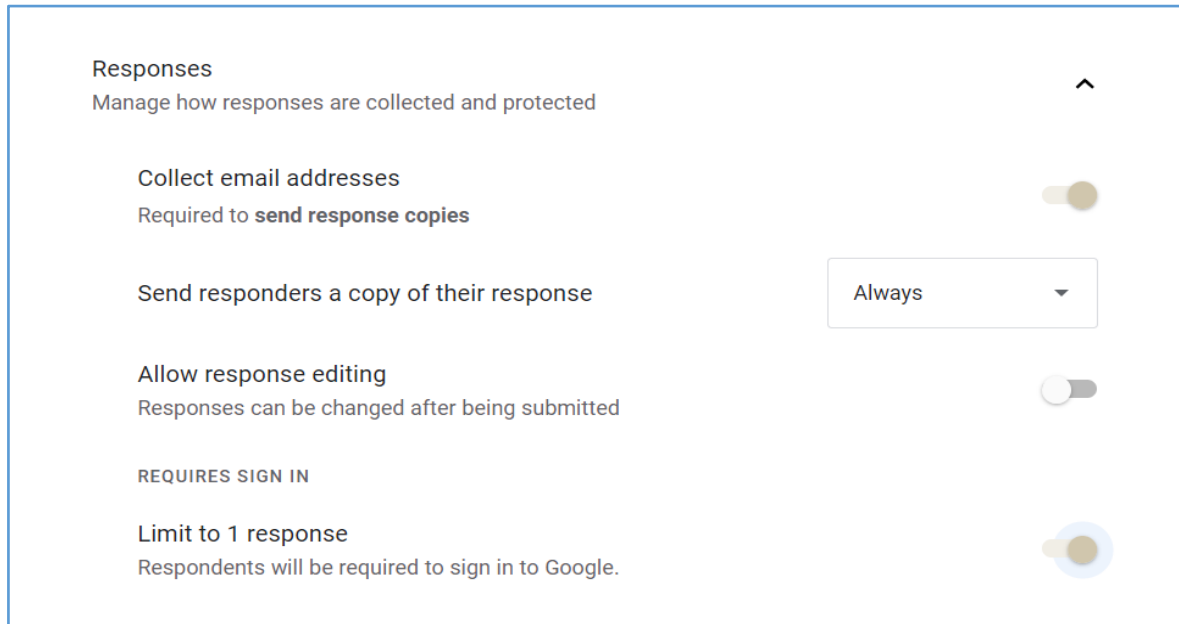
Name : *

Short answer text

Your Programme Name : *

1. MBA (General)
2. MBA (BFS)
3. MBA (BA)
4. MBA (Environment Management)
5. MSc (Environment and Safety)
6. MSW
7. MSc (QE)
8. MA (Counseling and Guidance)

Figure 10(a): Google Form for GE Course Selection

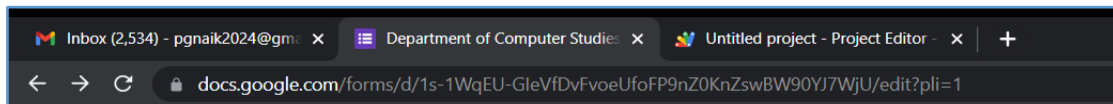


The image shows the 'Responses' settings panel in Google Forms. It includes the following options:

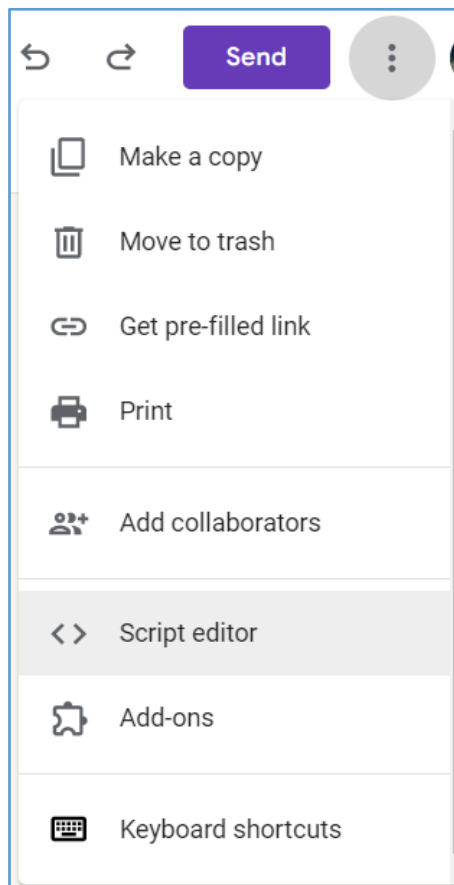
- Collect email addresses**: A toggle switch that is turned on. Below it, it says 'Required to **send response copies**'.
- Send responders a copy of their response**: A dropdown menu currently set to 'Always'.
- Allow response editing**: A toggle switch that is turned off. Below it, it says 'Responses can be changed after being submitted'.
- REQUIRES SIGN IN**: A section header.
- Limit to 1 response**: A toggle switch that is turned on. Below it, it says 'Respondents will be required to sign in to Google.'

Figure 10(b): GE Course Selection Form Customization

The unique identifier associated with the form is shown below:

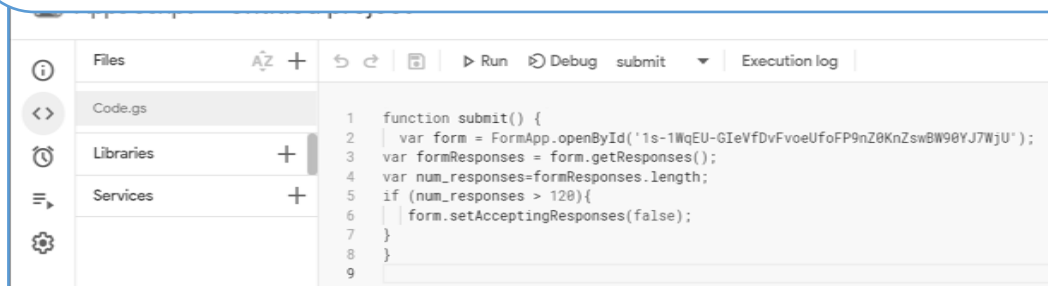


Due to the limited availability of human resource a sealing of 120 is declared for each GE course and the selection is on first come first serve basis. To automatically turn off the responses when the cut-off is reached a script is implemented and is associated with the trigger which is automatically executed on form submission. The scrip editor can be launched by clicking on three ellipsis on the upper right corner of the form.



The Google script to automatically turn off the responses when the cut-off is reached is shown below:

```
function submit() {
var form = FormApp.openById('1s-
1WqEUGIeVfDvFvoeUfoFP9nZ0KnZswBW90YJ7WjU');
var formResponses = form.getResponses();
var num_responses=formResponses.length;
if (num_responses > 120){
```



Associating the submit() function with the form_submit Trigger.

To associating the submit() function with the form_submit trigger, click on the ‘triggers’ menu option I the left menu show in Figure 10.

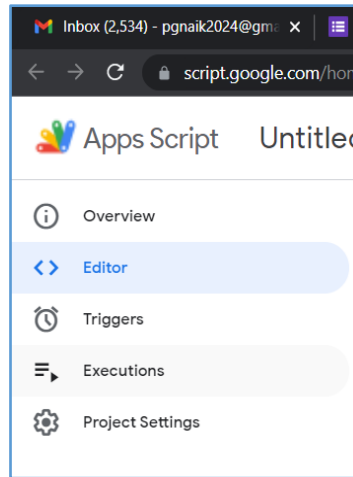
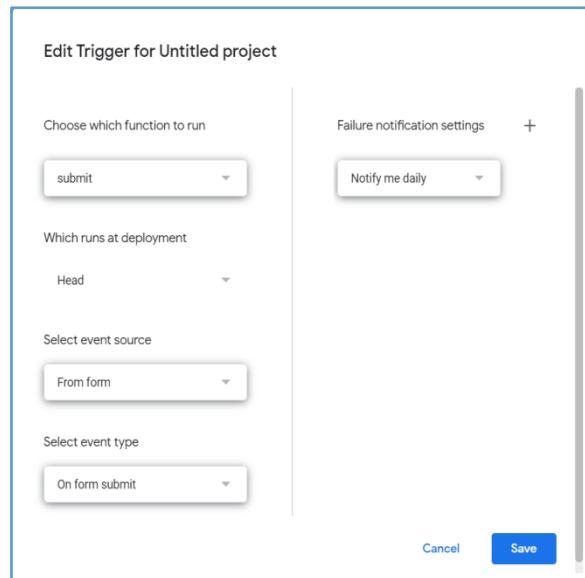


Figure 11: Structure of Left Menu

In the resulting dialog, select ‘submit’ for function to run option and ‘on form submit’ for event type.



Click on ‘Save’ button and the trigger is created as shown in Figure 12.

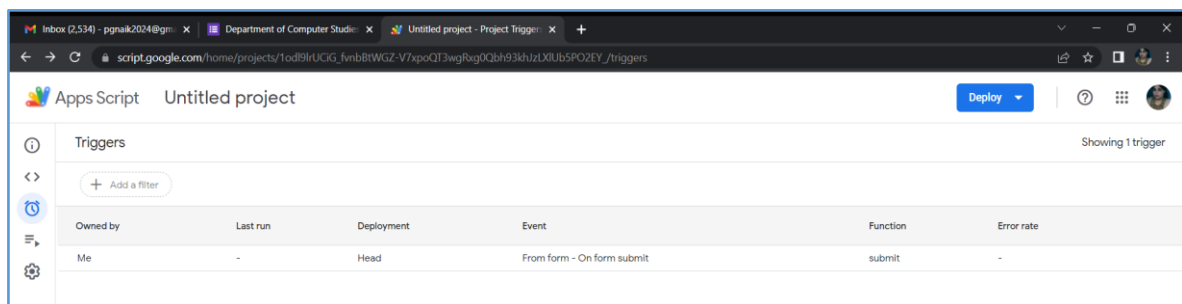
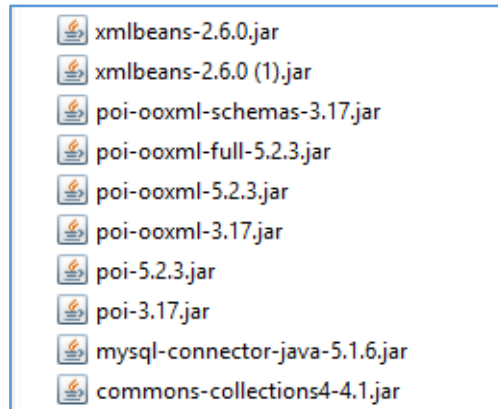


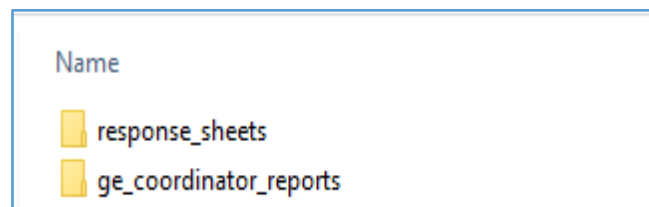
Figure 12: Creation of Trigger for form submit event.

IV. Auto Generation of Reports

- 1. Reports for GE Coordinators:** The GE report generation process is automated by implementing the relevant APIs in business logic tier. The reports are exported by the system in Excel format. The different JAR files required for the implementation of business logic are shown below:



The folder 'response_sheets' contains the five Google response sheets in Excel 97 format.



The structure of the folder 'response_sheets' is shown in Figure 13.

Name	Date modified	Type	Size
Department of Commerce and Manage...	03-03-2023 07:47 ...	Microsoft Excel 97...	38 KB
Department of Computer Studies (E-Co...	02-03-2023 09:45 ...	Microsoft Excel 97...	40 KB
Economics Department (BASICS OF INDI...	03-03-2023 08:14 ...	Microsoft Excel 97...	29 KB
Environment Management (DISASTER M...	03-03-2023 08:16 ...	Microsoft Excel 97...	43 KB
Social Work Department (CORPORATE S...	03-03-2023 08:12 ...	Microsoft Excel 97...	43 KB

Figure 13: Google Response Sheets Residing in 'response_sheets' Folder.

Format of Worksheet Containing Responses is shown in Figure 14.

	A	B	C	D	E	F
1	Timestamp	Email Address	Roll No. :	Name :	Your Programme Name :	
2	2-20-2023 12:15:32	sourabh.barale.79@gn	04	Barale Sourabh Bajara	MBA (BA)	
3	2-20-2023 12:15:35	ashutoshmail1221@gm		109 Ashutosh Dhananjay M	MBA (General)	
4	2-20-2023 12:15:37	digvijaypol0126@gmai		128 DIGVIJAY RAM POL	MBA (General)	
5	2-20-2023 12:15:41	jabhijit8408@gmail.con		14 JADHAV ABHIJIT SAT	MBA (Environment Management)	
6	2-20-2023 12:15:41	maheshmalharijadhav@		16 JADHAV MAHESH MA	MBA (Environment Management)	
7	2-20-2023 12:15:42	sushamsarnaik003@gr		50 SUSHAM SARNAIK	MBA (Environment Management)	
8	2-20-2023 12:15:43	vaibhavtikode93@gmai		45 Vaibhav Namdev Tikod	MBA (BA)	
9	2-20-2023 12:15:45	chabukswar.prayag@c05		Chabukswar Prayag Vi	MBA (Environment Management)	
10	2-20-2023 12:15:48	srahatankar1@gmail.ci		130 Rhatankar Shubham M	MBA (General)	
11	2-20-2023 12:15:49	akashkilledar8066@gm		29 Akash Eknath Killedar	MBA (Environment Management)	
12	2-20-2023 12:15:51	pranavbhatt1511@gma05		Pranav Bhatt	MBA (BA)	
13	2-20-2023 12:15:52	abhishekbudhale20@g		12 Abhishek budhale	MBA (General)	
14	2-20-2023 12:15:52	manechaitanya68@gm		37 Mane Chaitanya Arun	MBA (General)	
15	2-20-2023 12:15:53	rautshubham575@gme		59 Shubham Dilip Raut	MBA (General)	
16	2-20-2023 12:15:55	ramjanmujawar119@gr		26 Ramjan Dastagir Mujav	MBA (BA)	
17	2-20-2023 12:15:57	prachipatip5499@gma		50 Prachi Sanjay Patil	MBA (General)	
18	2-20-2023 12:15:57	kolipriyanka2017@gme		33 Koli Priyanka Popat	MBA (General)	
19	2-20-2023 12:15:58	mrmadhurajrananavare		37 Rananavare Madhuraj	MBA (BA)	
20	2-20-2023 12:15:59	vijaynandeshwar07@gi		27 Vijaykumar Dhanappa	MBA (BA)	
21	2-20-2023 12:16:01	anjalikoli17@gmail.com		105 Anjali Ashok koli	MBA (General)	
22	2-20-2023 12:16:03	nuleshsutar282@gmail		42 Nilesh mahadev sutar	MBA (BA)	

Figure 14: Format of Google Worksheet Responses

2. **Data Cleaning:** To generate the reports for GE coordinator the following tasks are executed:

- Timestamp and Email Address Columns are deleted.
- The Excel spreadsheet is sorted on Programme Name.
- The header ‘GE Selection Report (E-Commerce)’ is printed.
- The footer containing the following information is printed.
 - Total No. of Students
 - Name of GE Coordinator
 - Print ‘Prepared by Department of Computer Studies’.

On execution of business logic the reports for the GE coordinators are auto generated and are saved in the folder ‘ge_coordinaor_reports’ as shown in Figure 14. The naming convention used for file is as follows:

<Department Name>_<GE Coordinator Name>

Name	Date modified	Type	Size
Department of Commerce and Manage...	03-03-2023 08:19 ...	Microsoft Excel 97...	12 KB
Department of Computer Studies_Sneh ...	03-03-2023 08:19 ...	Microsoft Excel 97...	12 KB
Economics Department_Kishor Kumar.xls	03-03-2023 08:19 ...	Microsoft Excel 97...	10 KB
Environment Management_Rachana Ing...	03-03-2023 08:20 ...	Microsoft Excel 97...	12 KB
Social Work Department_Suresh Apte.xls	03-03-2023 08:20 ...	Microsoft Excel 97...	13 KB

Figure 15: GE Coordinator Reports Residing in ‘ge_coordinator_reports’ Folder.

Format of the GE Coordinator Report

The format of GE coordinator report is shown in Figure 15.

	A	B	C
1	GE Selection Report (E-Commerce)		
2			
3	Roll No. :	Name :	Your Programme Name :
4	3	Barage Omkar Sanjay	MBA (BA)
5	4	Barale Sourabh Bajarang	MBA (BA)
6	5	Pranav Bhatt	MBA (BA)
7	6	Bhosale Preeti Prakash	MBA (BA)
8	7	Bote Nikhil Manohar	MBA (BA)
9	8	Gaikwad Preeti Tanaji	MBA (BA)
10	10	Kalyani Rajendra Gijavanekar	MBA (BA)
11	11	Somesh Suhas Jadhav	MBA (BA)
12	12	Kachhi Muskan Arif	MBA (BA)
13	13	Kalyankar Anand Ashok	MBA (BA)
14	17	Ratnadeep Kamble	MBA (BA)
15	19	Vinayak Ramesh Khot	MBA (BA)
16	21	Revati koli	MBA (BA)
17	23	Darshan Shital Magdum	MBA (BA)
18	24	Mankar Rohan Nandkumar	MBA (BA)
19	26	Ramjan Dastagir Mujawar	MBA (BA)
20	27	Vijaykumar Dhanappa Nandeshwar	MBA (BA)
21	30	Dhiraj Vijaysinh Patil	MBA (BA)
22	31	Kamlesh Vitthal Patil	MBA (BA)
23	32	Patil Pritam Abaso	MBA (BA)
24	34	Esha Milind Potdar	MBA (BA)
25	37	Rananavare Madhuraj Pramodrao	MBA (BA)
26	39	Mayuri Chandrashekhar Shinde	MBA (BA)
27	40	PRAJAKTA RAMCHANDRA SHINDE	MBA (BA)
28	41	Rajatsing Rajesh Sonparote	MBA (BA)
29	42	Nilesh mahadev sutar	MBA (BA)
101			
102		Total :	97
103			
104		Name of GE Coordinator	Sneh A. Nagaokar
105			
106	Prepared by Department of Computer Studies		
107			

Figure 16: Format of GE Coordinator Report for E-Commerce

3. Reports for the Class Coordinators

Format of the Report for class coordinator is shown in Figure 17.

	A	B	C	D
1	GE Selection Report for M.Sc.(QE)			
2				
3	Roll No. :	Name :	Your Programme Name :	
4	1	Omkar Sanjay Gavali	MSc (QE)	
5	2	Ankita Rajendra Kagwade	MSc (QE)	
6	4	Eshika manohar pawar	MSc (QE)	
7	5	Meenakshi Sharma	MSc (QE)	
8	6	Sagarika kiran shinde	MSc (QE)	
9				
10				
11		Total :	5	
12				
13	Name of Class Coordinator	V R Kishorkumar		
14				
15	Prepared By Department of Computer Studies			
16				
17				

Figure 17: Format of the Report for class coordinator

In the Excel workbook each tab contains the programme name.

To generate the reports for Class coordinator the following tasks are executed:

- Create consolidated Excel worksheet by merging all the responses containing the following columns:
 - Roll No : , Name : and Your Programme Name : columns.
 - Print total no. of responses.
 - Custom sort on the following fields
 - Your Programme Name
 - Roll No
 - Copy different programmes to different worksheets
 - Print the header ‘GE Selection Report M.Sc. (QE)’
 - Print footer containing the following information
 - Total No. of Students
 - Name of Class Coordinator
 - Print ‘Prepared by Department of Computer Studies’ .
- on each worksheet.

V. EXPERIMENTAL RESULTS AND DISCUSSIONS

The system designed and implemented above is deployed on GoDaddy server as a micro site where the institute’s website is hosted. To launch the micro site, click on the link given below for online GE selection process:

<http://www.siberindia.edu.in/genericElective>

The home page of the site is displayed as shown in Figure 18.



Figure 18: Home Page of GE Selection Micro Site

The menu hosted by the system is shown in Figure 18.



Figure 19: Menu System of Generic Selection Micro Site

Click on 'View Syllabus', to get detailed syllabus of concerned GE subject.



Figure depicts the E-Commerce course curriculum launched by department of Computer Studies.

Semester	III	Total Credit	4
Course Code	GE-301	Credit Pattern	L-48, T-12, P-00
Course Title	E-Commerce		

Course Objectives

- To explain the nature and different models of E-commerce
- To explain the technologies required to make e-Commerce viable.
- To discuss the current drivers and inhibitors facing the business world in adopting and using e-commerce and
- To discuss the trends in e-Commerce and the use of the Internet.
- To discuss e-commerce from an enterprise point of view.
- To demonstrate the concepts of security in e-commerce applications.

Course Outcomes

After completion of this course the student will be able to:

- Recognize the business impact and potential of e-commerce
- Develop a holistic perspective on the role of IT in organizations.
- Identify target market based on numerous parameters.
- Select appropriate e-commerce models for any organization.
- Follow security measures while dealing with e-commerce applications.

Unit Number	Contents	Number of Sessions	
1	History of e-commerce and Indian business context, www, advantages and disadvantages of e-commerce, e-commerce in India, various Indian case studies. Business models for e-commerce, different type of e-commerce, brokerage model, aggregator model, info-mediary model, community model, value chain model, manufacturer model, advertising model, subscription model, affiliate model.	L=12	
		T-03	P=00
2	Technologies of the www & e-security, internet client-server applications, networks and internets, URL, software agents, internet service providers, html, java script and xml, e-security, security on the internet, hacking, various security risks, e-business risk management issues, firewall.	L=12	
		T-03	P=00

Figure 20: E-Commerce Course Curriculum Launched By Department of Computer Studies.

The links to the important documents (User Manual and GE Selection Guidelines) are provided which can be accessed by clicking the appropriate link.

Important Documents

Click Here to View User Manual

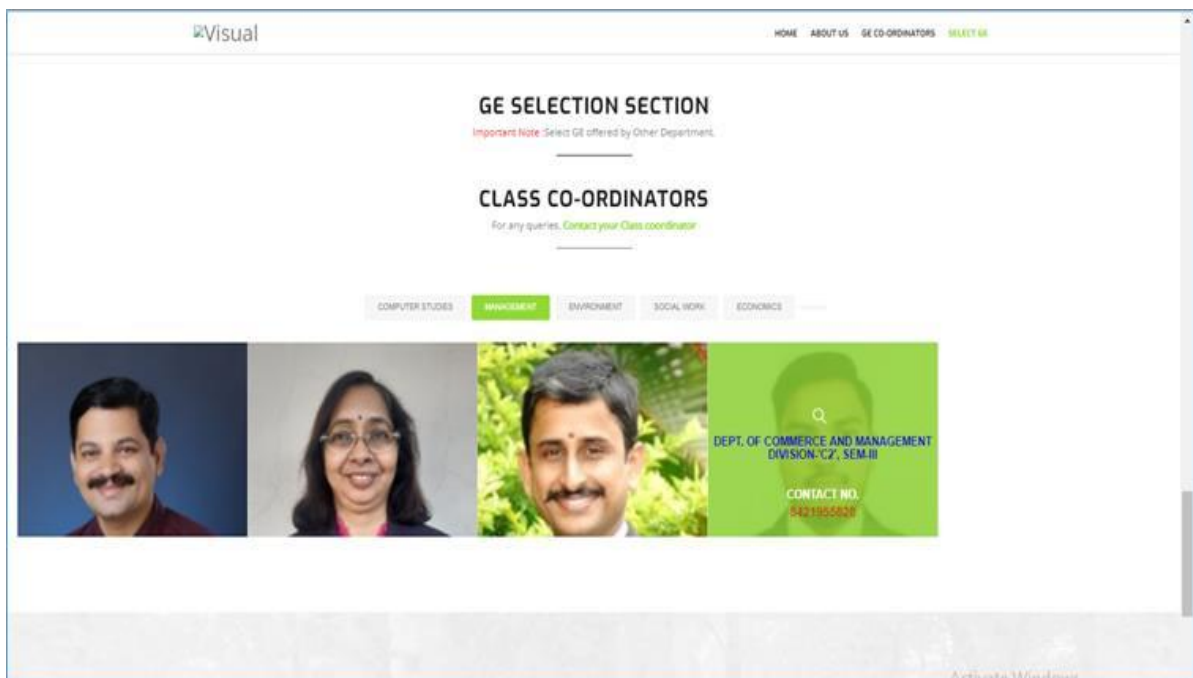
Click Here to View GE Selection Guidelines

Click Here

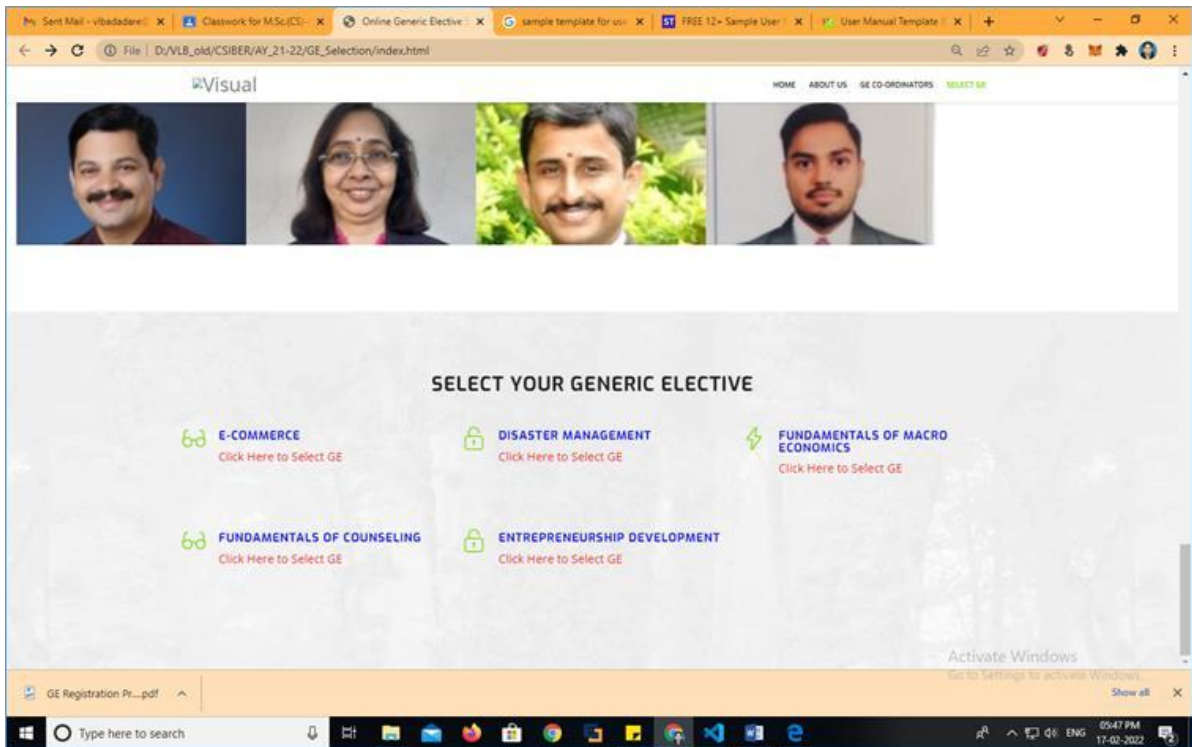


Click on 'Select GE' tab to navigate to GE selection section

In the first part GE selection section, you will find details of Class-coordinators to whom you In GE Selection section, Scroll down to select GE subjects



To Select your Generic Elective, click on the link provided along with subject name



After clicking on the link, you will navigate to Google form

A screenshot of a Google Form titled "Social Work Department (Fundamentals of Counseling)". The form is displayed on a light gray background. At the top, it shows the user's email address "vidyabadadare@gmail.com" with a "Switch account" link and a cloud icon. Below this, there are four input fields: "Email *" (with a red asterisk indicating it is required), "Roll No.:", "Name:", and "Your Department Name:". The "Your Department Name:" field has a dropdown menu with the text "Choose". At the bottom of the form, there is a "Submit" button and a "Clear form" link.

You are required to fill the form with correct email-id, Roll no., Your Full name and Your Department name

The automated reports generated by the system are shown below:

Sample GE Coordinator Report

	A	B	C
1			
2		GE Selection Report(E-Commerce)	
3	Rollno	Name	Programme Name
4	0	ghodake Pranav Sambhaji	MBA (BA)
5	3	Barage Omkar Sanjay	MBA (BA)
6	4	Barale Sourabh Bajarang	MBA (BA)
7	5	Pranav Bhatt	MBA (BA)
8	6	Bhosale Preeti Prakash	MBA (BA)
9	7	Bote Nikhil Manohar	MBA (BA)
10	8	Gaikwad Preeti Tanaji	MBA (BA)
11	10	Kalyani Rajendra Gijavanekar	MBA (BA)
12	11	Somesh Suhas Jadhav	MBA (BA)
13	12	Kachhi Muskan Arif	MBA (BA)
14	13	Kalyankar Anand Ashok	MBA (BA)
15	14	Kamale Kunal Sanjay	MBA (BA)
16	17	Ratnadeep Kamble	MBA (BA)
17	18	Ketan hindurao kerle	MBA (BA)
18	19	Vinayak Ramesh Khot	MBA (BA)
19	21	Revati koli	MBA (BA)
20	23	Darshan Shital Magdum	MBA (BA)
21	24	Mankar Rohan Nandkumar	MBA (BA)
22	25	Mogane Sukanya Milind	MBA (BA)
23	26	Ramjan Dastagir Mujawar	MBA (BA)
24	27	Vijaykumar Dhanappa Nandeshwar	MBA (BA)
25	30	Dhiraj Vijaysinh Patil	MBA (BA)
26	31	Kamlesh Vitthal Patil	MBA (BA)

	Total :	102
	Name of GE Coordinator :	Sneh Nagaokar
Prepared By Department of Computer Studies		

Sample Class Coordinator Reports

	A	B	C	D	E
1	GE Selection Report for MBA (BFS)				
2					
3	Rollno	Name	GE Subject Name		
4	1	Deshpande Mrunal Kiran	E-Commerce		
5	2	Aditya Gurav	E-Commerce		
6	3	Utkarsha Gajanan Jadhav	Corporate Social Responsibility		
7	4	Kadam sayali diliprao	Corporate Social Responsibility		
8	5	Rutuja Shashikant Kamble	E-Commerce		
9	6	Shivani Vinod Kamble	E-Commerce		
10	7	Shraddha Amit Kulkarni	Corporate Social Responsibility		
11	8	Tejas Raghunath Kumbhar	E-Commerce		
12	9	Rutuja Nitin Mane	Corporate Social Responsibility		
13	10	Rahul Tanaji Nikam	Corporate Social Responsibility		
14	11	Patil Aniruddha Rajendra	Corporate Social Responsibility		
15	12	DIKSHA DATTATRAY PATIL	Corporate Social Responsibility		
16	13	Nandkumar Patil	Basics of Indian Economy		
17	15	Sakshi Shailesh shaha	E-Commerce		
18	16	Ajay Bhausahab Shinde	E-Commerce		
19	17	Sushama sutar	E-Commerce		
20	18	Priyanka Ramchandra Vadar	E-Commerce		
21	19	Kailas Prakash Mirajkar	Basics of Indian Economy		
22					
23					
24		Total :	18		
25					
26		Name of Class Coordinator :	K.H.Chougule		
27					
28		Prepared By Department of Computer Studies			
29					
30					

The Excel report showing the programmewise count of students who have selected GE course is shown below:

	A	B	C
1			
2			
3	Row Labels	Count of Roll No. :	
4	M. Sc (CS)	23	
5	M.Sc.(CS in Cyber Security)	19	
6	MA (Counseling and Guidance)	2	
7	MBA (BA)	37	
8	MBA (BFS)	17	
9	MBA (General)	127	
10	MBA(Environment Management)	49	
11	MCA	65	
12	MSc (Environment and Safety)	13	
13	MSc (QE)	5	
14	MSW	96	
15	Grand Total	453	
16			

The pivot table showing the no. of students from different programmes selecting different GE courses is shown below:

	A	B	C	D	E	F	G
1							
2							
3	Count of Roll No. :	Column Labels					
4	Row Labels	Basics of Indian Economy	Corporate Social Responsibility	Disaster Management	E-Commerce	Entrepreneurship Development	Grand Total
5	M.Sc (CS)	4			4		15
6	M.Sc (CS in Cyber Security)		3		1		15
7	MA (Counseling and Guidance)				2		2
8	MBA (BA)		7			30	37
9	MBA (BFS)	1	7			9	17
10	MBA (General)		55		26	46	127
11	MBA(Environment Management)		39			7	49
12	MCA	12	1		21		31
13	MSc (Environment and Safety)		9				4
14	MSc (QE)						5
15	MSW	6			66	5	19
16	Grand Total	23	121		120	97	453
17							

VI. CONCLUSION AND SCOPE FOR FUTURE WORK

The authors have designed and developed a web based generic course selection software which is operational for the last several years. The load distribution between the client and the server, scalable N-tier Micro Service architecture are incorporated as performance measures. Due to the limited availability of human resource a sealing of 120 is declared for each GE course and the selection is on first come first serve basis. As the curriculum undergoes a modification either structurally or content wise, as GE and class coordinators change, rules evolve, the software requires some sort of customization to incorporate the changes. In the current research authors have implemented the APIs in the business logic tier for the auto customization of GE software and the auto generation of reports for different stake holders. Different reports are required to be generated for GE coordinators, class coordinators and consolidated reports for general purpose. As of now, the report generation was carried out manually which is a time consuming process. To account for this the authors have automated the report generation process by implementing the relevant APIs in business logic tier. The reports are exported by the system in Excel format. The future work focuses on exporting the reports in various formats such as MS-Word, Excel etc. GMail integration and WhatsApp integration for creating groups and for auto sending of messages are some future enhancements which are due.

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