**2.2.2. Functional Requirements:**

Functional Requirements specifies about the system and it functions (For example, what to include in the system). It involves various processes such as elicitation, specification, analysis, verification, validation and management.

**2.2.3. Record Management System:**

It is the management system where all the records. This system helps to keep the record of confidential data and preserved the legal value of an organization. It stores all the data and classifies the records in an excellent manner.

Inside the Course Management System, the records of students, staffs, course, module, assignment, attendance, personal tutor, timetable, diary and report generation are included.

* Student Record Management:

In this management, the records of student such as their names, address, section, email and all other personal information are kept in an organized manner. It plays a vital role in course management system. It also contains other information of student such as the course they took and attendance.

Access Rights:

It is about the access rights given to the user. In this course management system, Users are module leader, students, personal tutor and administrator.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functions | Students | Administrator | Module leader | Personal tutor |
| Create Students | No Access | Access | No Access | No Access |
| Amend Students | No Access | Access | No Access | No Access |
| Archive Students | No Access | Access | No Access | No Access |
| Display Students | Access | Access | No Access | No Access |
| Assign Students | No Access | Access | Access | No Access |

Students:

The following table shows the attribute and data type for student.

|  |  |  |
| --- | --- | --- |
| Attributes | Data Type | Description |
| student\_id | NUMBER(8) | Unique identifier of students |
| course\_id | NUMBER(5) | Foreign key. Students assign to particular courses |
| module\_id | NUMBER(5) | Foreign key. Students assign to particular modules. |
| student\_first\_name | VARCHAR2(15) | Student’s first name |
| student\_last\_name | VARCHAR2(10) | Student’s last name |
| student\_email | VARCHAR2(20) | Student’s email address |
| student\_contact\_no | NUMBER(10) | Student’s personal contact number |
| student\_blood\_group | VARCHAR2(5) | Student’s blood group |
| student\_DOB | DATE | Student’s date of birth |
| student\_guardian\_name | VARCHAR2(12) | Student’s guardian name |

* Staffs Record Management:

In this management, all the records of the staff such as their names, id, email, address and other personal information are kept in an organized manner. Other overall performance such as attendance lists, leave records are also recorded in this staffs record management. It helps to keep the accurate records of the staff such as their work payment, working hours and the particular course/duties they are assigned to. This decrease the potential disputes between management and staffs.

Access Rights:

The following table shows the attribute and data type for staffs.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functions | Students | Administrator | Module leader | Personal tutor |
| Create Staffs | No Access | Access | No Access | No Access |
| Amend Staffs | No Access | Access | No Access | No Access |
| Archive Staffs | No Access | Access | No Access | No Access |
| Display Staffs | No Access | Access | No Access | Access |
| Assign Staffs | No Access | Access | Access | Access |

Lecturer:

The following table shows the attribute and data type of lecturer.

|  |  |  |
| --- | --- | --- |
| Attributes | Data type | Description |
| lecturer\_id | NUMBER(5) | Unique identifier of lecturer |
| course\_id | NUMBER(5) | Foreign key |
| module\_id | NUMBER(5) | Foreign key\* |
| lecturer\_firstname | VARCHAR2(12) | lecturer’s first name |
| lecturer\_lastname | VARCHAR2(10) | lecturer’s last name |
| lecturer\_email | VARCHAR2(20) | lecturer’s email |
| lecturer\_contact | NUMBER(5) | Lecturer’s contact |
| Lecturer\_address | VARCHAR2(15) | Lecturer’s address |

Admin:

The following table shows the attribute and data type of admin:

|  |  |  |
| --- | --- | --- |
| Attributes | Data type | Description |
| admin\_id | NUMBER(5) | Unique identifier for admin |
| admin\_first\_name | VARCHAR2(12) | Admin’s first name |
| admin\_last\_name | VARCHAR2(12) | Admin’s last name |
| admin\_contact | NUMBER(10) | Admin’s contact |
| admin\_email | VARCHAR2(20) | Admin’s email |
| admin\_address | VARCHAR2(15) | Admin’s address |

* Course Record Management:

In this course management, all the records of course such as course name, course leader and other important topics regarding course are recorded. Past records can be retrieved easily as they are preserved in the record management.

Access Rights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functions | Students | Administrator | Module leader | Personal tutor |
| Create Course | No Access | Access | No Access | No Access |
| Structure Course | No Access | Access | Access | No Access |
| Amend Course | No Access | Access | No Access | No Access |
| Display Course | Access | Access | Access | Access |
| Delete Course | No Access | Access | No Access | No Access |
| Archive Course | No Access | Access | No Access | No Access |

Course:

The following table shows the attribute and data type for course.

|  |  |  |
| --- | --- | --- |
| Attributes | Data type | Description |
| course\_id | NUMBER(5) | Unique identifier of course |
| module\_id | NUMBER(5) | Foreign key |
| course\_name | VARCHAR2(12) | Course’s name |
| course\_leader\_name | VARCHAR(12) | Course leader’s name |
| course\_length | VARCHAR(8) | Length of the course |
| no\_of\_semester | VARCHAR2(15) | No of semester in particular course |

* Module Record Management:

In this management, all the records of module such as module name, module code and particular leader of that module are recorded.

Access Rights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functionality | Students | Administrator | Module leader | Personal tutor |
| Create Module | No Access | Access | Access | No Access |
| Amend Module | No Access | Access | Access | No Access |
| Delete Module | No Access | Access | No Access | No Access |
| Archive Module | No Access | Access | No Access | No Access |
| Display Module | Access | Access | Access | Access |
| Assign Module | No Access | Access | Access | No Access |

Module:

The following table shows the attribute and data type for module.

|  |  |  |
| --- | --- | --- |
| Attributes | Data type | Descriptions |
| module\_id | NUMBER(5) | Unique identifier of module |
| lecturer\_id | NUMBER(5) | Foreign key(id of module lecturer of the particular module) |
| assessment\_id | NUMBER(5) | Foreign key(assessment’s id ) |
| module\_name | VARCHAR2(10) | Module’s name |
| module\_materials | VARCHAR(20) | Materials of module |
| module\_length | NUMBER(8) | Length of the module |
|  |  |  |

* Assignment Record Management:

It is the record management where all the assignment related information such as assignment date, assignment submission date etc are recorded.

Access Rights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functionality | Students | Administrator | Module leader | Personal tutor |
| Create Assignment | No Access | Access | Access | No Access |
| Amend Assignment | No Access | Access | Access | No Access |
| Delete Assignment | No Access | Access | Access | No Access |
| Archive Assignment | No Access | Access | No Access | No Access |
| Display Assignment | Access | Access | Access | Access |
| Assign Assignment | No Access | Access | Access | No Access |
| Mark/Grade Assignment | No Access | Access | Access | No Access |

Assignment:

The following table shows the attribute and data type for assignment.

|  |  |  |
| --- | --- | --- |
| Attributes | Data type | Descriptions |
| assignment\_id | NUMBER(5) | Unique identifier of assignment |
| module\_id | NUMBER(5) | Foreign key |
| assigned\_date | DATE | The date when assignment are assigned to the students. |
| assignment\_deadline | DATE | The date when students need to submit the assignment. |

* Attendance Record Management:

In this attendance record management, attendance of students and lecturers are recorded i.e. their presence day and absence day.

Access Rights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functionality | Students | Administrator | Module leader | Personal tutor |
| Create Attendance | No Access | Access | Access | No Access |
| Amend Attendance | No Access | Access | Access | No Access |
| Archive Attendance | No Access | Access | No Access | No Access |
| Monitor Attendance | No Access | Access | No Access | No Access |
| Display Attendance | No Access | Access | Access | No Access |
| Action poor Attendance | No Access | Access | No Access | No Access |

Attendance:

The following table shows the attribute and data type for assignment.

|  |  |  |
| --- | --- | --- |
| Attributes | Data type | Description |
| attendance\_id | NUMBER(5) | Unique identifier of attendance table |
| student\_id | NUMBER(8) | Foreign key |
| module\_id | NUMBER(5) | Foreign key |
| lecturer\_id | NUMBER(5) | Foreign key |
| year | NUMBER(4) | Attendance’s year |
| semester | VARCHAR2(9) | In which semester attendance recorded |
| date | DATE | Date of the attendance |

* Personal Tutor Record Management

In this management, all the records of personal tutor are recorded such as their name, contact number and the students they are assigned.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functionality | Students | Administrator | Module leader | Personal tutor |
| Create tutor | No Access | Access | No Access | No Access |
| Amend tutor | No Access | Access | No Access | No Access |
| Assign tutor | No Access | Access | No Access | No Access |
| Display tutor | Access | Access | Access | Access |

Personal Tutor:

The following table shows the attribute and data type for personal tutor.

|  |  |  |
| --- | --- | --- |
| Attributes | Data type | Description |
| tutor\_id | NUMBER(5) | Unique identifier for tutor. |
| student\_id | NUMBER(5) | Foreign key |
| tutor\_full\_name | VARCHAR2(25) | Tutor’s full name |
| tutor\_email | VARVHAR2(20) | Tutor’s email |
| tutor\_contact\_number | NUMBER(10) | Tutor’s contact number |
| tutor\_address | VARCHAR2(10) | Tutor’s address |

* Time Table Record Management:

Timetable is the snapshot where the class routine records are recorded which only repeat over the time period.

Access Rights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functionality | Students | Administrator | Module leader | Personal tutor |
| Create time table | No Access | Access | No Access | No Access |
| Amend time table | No Access | Access | No Access | No Access |
| Delete Time table | No Access | Access | No Access | No Access |
| Archive Time Table | No Access | Access | No Access | No Access |
| Display Time Table | Access | Access | Access | No Access |

Time table:

|  |  |  |
| --- | --- | --- |
| Attributes | Data type | Description |
| time\_table\_id | NUMBER(5) | Unique identifier for time table |
| course\_name | VARCHAR2(10) | Foreign key |
| module\_name | VARCHAR2(12) | Foreign key |
| lecturer\_name | VARCHAR2(12) | Foreign key |
| room\_number | NUMBER(6) | Classes held in the particular rooms and its number |
| year | NUMBER(4) | Table of particular year |
| semester | VARCHAR2(10) | Table of particular semester |
| Day |  |  |
| Time |  |  |

* Diary Record Management:

Diary management goes beyond the timetable as it keeps the record of visual calendar and class schedule, assignment submission deadline etc.

Access Rights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functionality | Students | Module leader | Administrator | Personal Tutor |
| Create Diary | No Access | No Access | Access | No Access |
| Amend Diary | No Access | No Access | Access | No Access |
| Display Diary | Access | Access | Access | Access |
| Prompt Diary | No Access | No Access | Access | No Access |
| Initiate Automated Action | No Access | No Access | Access | No Access |

Diary:

The following table shows the attribute and data type for diary.

|  |  |  |
| --- | --- | --- |
| Attributes | Data Type | Description |
| diary\_id |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

* Report Record Generation/Management(Result Management)

In this management all the records of reports such as students grade in particular module, marks and final grading of semester are recorded.

Access Rights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functionality | Student | Module leader | Administrator | Personal Tutor |
| Create Report | No Access | Access | Access | No Access |
| Display Report | Access | Access | Access | Access |
| Print | No Access | Access | Access | No Access |

Report Record:

The following table shows the attribute and data type for report.

|  |  |  |
| --- | --- | --- |
| Attributes | Data type | Description |
| report\_id | NUMBER(5) | Unique identifier of report |
| student\_id | NUMBER(8) | Foreign key |
| assignment\_id | NUMBER(5) | Foreign key |
| module\_id | NUMBER(5) | Foreign key |
| total\_marks | VARCHAR2(4) | total marks of the particular module |
| final\_grade | VARCHAR2(4) | Final grade of the module |
| year | NUMBER(4) | Result of particular year |
| semester | VARCHAR2(9) | Result of particular semester |
| release\_date | DATE | Released date of the report |

**2.1.3.1.2 Student Records/Information Portal**

This is about a login portal that provides access to users who have an ID and password to log in. The university will provide each user with a unique ID and password so that they can log in and browse the site. Ifyou have forgottenyour password, there are sections for Forgot Password and Reset Password. If you need more help, you can click the Help button to ask your administrator for help. Inside it, user can see their own profile and go through the options seen at the left hand side of the page. Options are profile, home, courses, attendance, calendar, timetable and result.

**2.1.3.1.3 Woodlands University College Corporate Website**

The website of Woodlands University College Corporate is an educational website that should provide all the information of the college to the viewer. Visitor can navigate through one page to another page through navigation bar as there are homepage, contact page, courses page, community page and about us page.

From the home page visitor can know overall information of the college like college’s location, theme of the college etc. It fascinates the visitor about the college and they want to know more about the college through this website. This is the main page that welcomes the visitor and mostly helps the students who want to join this college for further study.

Contact page helps those who want to know more additional detail of the college which aren’t included in the website. This page has a form where you can enter your name, email address, messages you would like to share to the university, and additional details of interest. Your curiosity can be response by the university. They can directly communicate with the university through the website.

Course page have all the information related to the courses available in the university. It provided detailed information of the course to the viewer.

Community page have other information like news, upcoming events etc.

**2.2.3 Performance Requirements**

Performance Requirements include speed, capacity, reliability, usability, accessibility and so on. The following are the performance requirement of record management system.

* **2.2.3.1 Record Management System:**

2.2.3.1.1 Speed:

It is about the speed of the record management. It determines the time taken by the system to records a batch of other records such as students, lecturers, administrators, course, module, attendance, result, diary, timetable etc. This system can record about more than a hundred thousand records at a time.

2.2.3.1.2 Capacity

It is about the total capacity of the system and about its recording capacity. It also determines the number of operations which can be performed at the same time .A data of 60TB can be stored in this system.

2.2.3.1.3 Reliability

It depends on the workload of the system. The more work the more workload will be to the system. To increase the efficiency of the system the optimization of database formation, parameters are necessary.

2.2.3.1.4 Usability

Usability mainly is the rate of the users that take time to learn this system. It took about one week for the new users to get familiar with the system.

2.2.3.1.5 Accessibility

Only the administrator has the access rights to the management of overall record management. They have the access to create, edit, delete, amend, archive and display all the records of the university.

* **2.2.3.2 Student Records/Information Portal**

2.2.3.2.1 Speed

It is about the speed of the information portal. It takes 4 -5 seconds to log in after the confirmation of id and password. With a large number of users, the server can become busy and take longer than usual. If the ID or password is incorrect then it would display incorrect ID or password and will be promoted to re-enter it. And the time taken by the user to go through one option to another option is 5 second if the server is not down.

2.2.3.2.2 Capacity

Due to the limited IDs and passwords given to users, there is capacity for the target user. Only with the use of login portal user can go inside the page.

2.2.3.2.3 Reliability

This login portal is very reliable because the ID is provided by the university administrator. One can change the password freely but the ID is unchanged as it is fixed. Information is confidential and reliable because it protects the privacy of the users.

2.2.3.2.4 Usability

Usability mainly is the rate of the users that take time to learn this system. It took about one week for the new users to get familiar with the system.

2.2.3.2.5 Accessibility

Those who have University Id and password have the access right to the portal.

* **2.2.3.3 Woodlands University College Corporate Website**

2.2.3.3.1 Speed

Users can surf through one page to another page using navigation bar. It took about 5 second to load while going from one page to another. The speed of the website depends upon the code quality, responsiveness etc. Sometimes the speed of the website might vary due to the server busy if there are many users at a same time.

2.2.3.3.2 Capacity

It is the total number of current users that the website can hold in a given period of time.

2.2.3.3.3 Reliability

It is the important factor in the performance requirement as it denotes how much the website is reliable in terms of information they provide. Is it trustworthy or not? This website has backup strategy and other policies that help to make this website more reliable.

2.2.3.3.4 Usability

It is about how easy the site is to use with basic skill, training and knowledge. For the new users it may take about 45 minutes of usage and with the help of the guidance available in the system. And for the beginners, it they should learn the management process of the website within 45 hours including training periods.

2.2.3.3.5 Accessibility

It is about the access rights of the user that are able to go through this site. Users can be anyone who can view this website.

**2.2.4 Design Constraints**

Design constraint means the limited design imposed in the purposed system. There are different types of design constraints. They include commercial constraint, functional requirements, non functional requirements, style, usability etc. Using Backend programming language such as PYTHON has been used and databases are connected through MY SQL for all three system. Thus we haven’t discussed about any kind of specific design constraint that’s why we’ve not used any other unique constraints in this system.

This system has four different privilege modes they are admin, students, module leader and tutor.

**2.2.4.1 Records Management Systems**

Dr Simon White approach this project to our team thus there are ten record management that must be include in the system. The system must keep the records of student, staff, course, module, assignment, attendance, personal tutor, timetable, diary and report management. The records should be kept in tabular form using database approach that be retrieved at any time they need. The information about the academic records should only be accessible to concerned students, teachers and administrator.

**2.2.4.2 Student Records/Information Portal**

This is about a login portal that provides access to users who have an ID and password to log in. The university will provide each user with a unique ID and password so that they can log in and browse the site. It should ask the user to enter the ID and Password. There should be forgot password, help and reset password section. And login button to submit and enter into the page. At the left corner of the portal there should have university logo for better outcome.

**2.2.4.3 Woodlands University College Corporate Website**

As per the instruction of Mr Simon White Nile has been the source for navigation, fonts, colour, theme etc. We took Nile as the reference for the design of this website. The menu bar should be at the side of the page and it gets hidden when the users are viewing courses. There is calendar section where the time of classes and date are shown. It should be visible for all the students and teachers. There is report section as well as per the documents the university has provided to us. Students have the access to their performance report. Extra features such as e-library, reference sites are only available at main system but not in the provisional system.

.

**2.2.5 Commercial Constraints (Total Project)**

Information of the assignment:

Project’s length: 1 month

Hourly cost: $2000 per person

Total number of team members: 6

|  |  |  |  |
| --- | --- | --- | --- |
| SECTION | WEEKS | HOURS WEEK PER PERSON | TOTAL COST |
| Requirements Engineering | 1 | 6 | $4,00,000 |
| Problem Domain | Half | 4 | $40,00,000 |
| Requirement Specification | 1 | 4 | $15,00,000 |
| Design and Analysis | 1 | 6 | $20,50,000 |
| System Interface Designs | Half | 5 | $15,00,000 |

|  |  |
| --- | --- |
| REASON | COST |
| Software cost | $60,00,000 |
| Office budget | $20,50,000 |
| Total build budget | $3,00,000 |
|  |  |
| Other expenses (20%) | $30,00,000 |
| Profit margin (30%) | $60,00,000 |
| Total project budget | $30,000,000 |

**2.2.6 Acceptance Tests (Total Project)**

It is the software test whether the requirements of clients have been delivered or not. The system we developed should satisfy not just client but also the users, business investors, members and authorized community. It is considered as the last part of the software test right after other tests such as unit test, integration, system test. The following tests are included in Acceptance Test.

1. Client Acceptance Test:

There are some things that are mandatory in this site. Four access modifiers should be there. The menu bar should be at the side of the page and it gets hidden when the users are viewing courses. Other things are tested in client acceptance test to meet the requirements set by client. It also includes in UAT (User Acceptance Test).

1. User Acceptance Test:

It includes whether the software can be accepted by them or not.

1. Business Acceptance Test:

It includes whether the software has meet the business requirements or not. The test is done through marketing and profit point of view.

1. Regulations Acceptance Test:

Rules and regulations have being violated or not is tested in this acceptance test. Confidential information should be kept private such as personal information of the admin and staffs should be kept safe only senior admin have the authorization to view such information. And the information about the academic records should be accessible to concerned students, teachers and admin only. These things are tested as per the clients.

Test Case:

Test case is the actions that should be performed after the completion of development of any kind of software projects. It includes every kind of test that satisfies the requirements of software and the functionalities involved in the software. It checks whether the requirements of customers are meet or not. The functions in the system are working or malfunctioning can be known through this test case. So this test is performed in every project of software engineering and other projects too.