UNSW SYDNEY

GSOE9820

ENGINEERING PROJECT MANAGEMENT

Social Network for UNSW Students

PROJECT MANAGEMENT PLAN

Submitted by: Group G20

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Contributions:	**Project Charter, Schedule, Risk Management Plan, Project Integration**	**Cost & Time estimate, HR plan, Stakeholder management and communication plan**	**WBS, Network Diagram, Budget table**	**Project Charter, Network Diagram, scope statement**	**Cost & Time estimate, Risk Management Plan, Stakeholder management and communication plan**	**Project Charter, Schedule, Risk Management Plan**
Declaration:						

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1 Project charter

1.1 Project Background

In recent years, with video conference equipment and high-speed network, the class-to-class model has emerged. This new mode of online education also helps students from different cultures, backgrounds, schools and countries to exchange knowledge, and is a good way to achieve global interaction in the new curriculum.

In the new era of online education, the core requirement is "interactivity". The one-way information distribution from teachers to students is no longer effective. The two-way interactive teaching environment is the key factor to enhance the learning experience. Interactive classroom can shorten the cycle time of education feedback and improve teaching efficiency.

It has to be said that the interactive classroom is of great importance to the curriculum reform. The early wireless interactive equipment was introduced in the 1990s. Students can answer single choice questions by using simple handheld devices. Later, smart devices were used to provide wireless Internet access and display interactive information on the device screen. However, this is not enough to meet people's latest requirements for mobile learning, that is, real-time, interactive and easy to use.

In order to meet these requirements for mobile learning, more and more online learning systems have been developed. Students can access online learning systems on smartphones and tablets, and interact with teachers and students through pictures and words.

The online learning system has adopted many new technologies, which has greatly improved the experience of classroom teaching. However, technological innovation is not enough to transform the entire online education era. The application development of systematic teaching method is equally important to enhance its performance and influence.

1.2 Project Objectives

The objective of the project is to build an online learning platform at UNSW which will be used as a foundation for technological development and research between universities and students. The project's benefits are closely aligned to UNSW's 2025 Strategy (1): "to improve lives globally through innovative research, transformative education, and commitment to a just society". This project exemplifies these in the following ways:

Develop entrepreneurship and innovation, enhancing opportunities for the entrepreneurial culture and increasing the number of startups that the UNSW Founders Program supports to 1100 by 2025.

Deliver a facility capable of sustaining high quality research and encouraging academic

excellence to contribute to the strategy involving University Research quality, sustaining UNSW within the top 50 research intensive universities worldwide.

Deliver a facility that offer hands on experience to over 500 students and researchers each year across the engineering and science disciplines.

Contribute to Educational Excellence by enabling lecturers to use it to enhance their mode of instruction.

1.3 Project scope

This project is to build a responsive website and mobile app under AUD 300,000 within 5 months starting 30th September 2022 – 30th February 2023 to better serve students.

The platform provides online group learning opportunities and integrates file upload and storage functions under high load conditions. Consult students and the industry to develop a language exchange function. It is necessary to understand and integrate all the existing functions of the UNSW Careers Team and the relevant UNSW Connect.

Evaluate that software platform has appropriate network capacity to support all students using at the same time without latency issues. Distinguish user access rights and ensure network security. All functions must be tested before shipping.

1.3.1 key technology

Based on SQL database technology, the model of three-tier architecture. The foreground technology of the online learning platform for students adopts html and JQUERY, which is suitable for the screen size. Students can have a better user experience on computers, mobile phones, tablets and other devices.

1.3.2 Function maintenance of subjective questions

In online learning platform, there is no way to automatically judge subjective questions. Question answering questions or reading questions need to be guided by subjective judgment. For subjective questions, students can enter answers directly, or make answers into word documents or take photos, and upload multiple documents or pictures. Arrange links that display multiple files or photos, and you can delete links.

1.3.3 Assessment realization

The administrator manually marks the subjective questions that the teacher authorizes to enter a certain course. The teacher marks the subjective questions and gives comments. The subjective questions can be queried by time period, teacher, course and item.

1.3.4 Module function realization

The overall idea of the system is that students can learn through the online learning platform, and the learning content can be evaluated online. The platform can directly evaluate the objective questions, and the subjective questions can be handed over to teachers for subjective evaluation and guidance.

1.3.5 Online test volume generation

Before generating the test paper, the knowledge points of the course shall be managed first. The knowledge points shall be classified according to the tree chart. The project management shall be carried out in the knowledge points. The objective questions supported include single choice, multiple choice, and judgment questions. Subjective questions include questions and answers, reading questions, etc.

1.3.6 File Settings

The stem and analytic content of subjective questions include text, pictures, videos, etc. When there are pictures in the stem or analytic content of subjective questions, in order to support the adaptive size of the pictures on the mobile phone, specific width and height cannot be set, the width parameters of the pictures are automatically replaced with percentage display. When generating the test paper, first set the number of big questions, the number of small questions for each big question, and each small question will be automatically captured from the specified chapters and knowledge points to generate the test paper.

1.3.7 Scoring function

Online evaluation is mainly for automatic evaluation of objective questions. Objective questions include single choice questions, multiple choice questions, judgment questions and other types of questions. Single choice questions and judgment questions use radio buttons to display the stem in the foreground, and multiple-choice questions use multiple buttons to display the stem in the foreground. After students answer questions, they submit and store the answers to each question, compare the students' answers with the correct answers on

the test paper, and give the correctness of each answer, In the answer sheet, red and blue are used to indicate the error and correct status, and scores are calculated.

1.4 Project Requirements

The response website and mobile application can connect students from 3 campuses

(Kensington, Paddington, and Canberra) and 6 faculties of the University of New South Wales.

Ensure the clarity and fluency of the platform

The interaction between teachers and students enables teachers to know more about students' mastery and students to give feedback in time.

This platform should provide students with the opportunity to form learning groups online and face-to-face based on their location and course.

The platform requires file upload/storage and integration with Microsoft Word.

The platform needs to provide a functional module so that students can organize and promote their mother tongue and practice their speech skills.

Integrate all existing capabilities of the UNSW Careers Team and the relevant UNSW Connect.

It must be able to keep all students actively using the platform at the same time, without delay problems, and have appropriate network capacity to support this.

There must be appropriate user access and permissions to integrate with the existing UNSW single sign on system while securely allowing guest access.

The UI/UX and functions must be fully tested before delivery, and the project success must be demonstrated to the project sponsor.

Provide guidance and training for students and staffs after delivery.

1.5 Team strategy

A routine checking of the plan is necessary to capture changes to the stakeholder information which could occur at any point in the Project lifecycle, even during the execution and control phase. Such changes could have significant implications to their project goals or contributions, and thus must be re-examined to adjust, if necessary, the management approach of the concerned stakeholders.

The stakeholder monitoring will be scheduled fortnightly and at every milestone completion which are both in line with the frequency of Ricks Audit as part of Risk Response Control. The identification of new risks that relates to stakeholders will be captured in this review process and also through the use of other tools described in Risk Identification. Through this constant monitoring and integration, it can promptly address new risks to manage its overall impact to the Project. Similarly, the opportunities arising from the movements in stakeholder power and influence will be aptly exploited to maximize at the value adding capacity of each stakeholder. Any change to the Plan will be subject to the change management process where a change request is required.

1.6 Project Benefits

For students:

Students can flexibly arrange their learning schedule according to their own time, progress and interest, self-arranged courses.

Only need a computer or mobile phone that can access the Internet, log in at anytime and anywhere; The platform resources will be updated regularly, which completely breaks the restriction of time and space, so that students can feel the full range of training content anytime and anywhere.

Reduce the conflict between work and study.

The online learning platform has a collection of high-quality courseware and integrates high-quality education and training resources. Many skills, knowledge and ideas provided through the latest learning resources for students.

For teachers:

Put forward suggestions in time through the platform to better optimize teachers' teaching methods

Reduce the workload of correcting homework

For school:

It can recruit more students and bring more income to the school

Reduce the daily maintenance and various personnel costs of the school

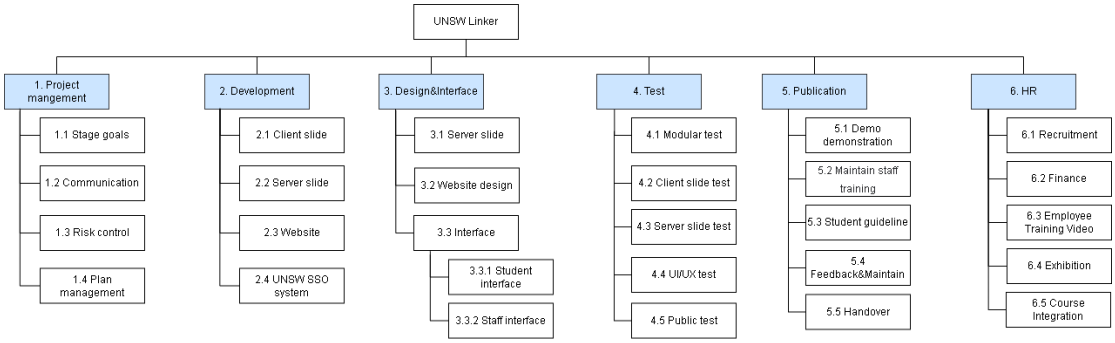
Enrich teaching diversity, provide more personalized services and attract more students

2.WBS

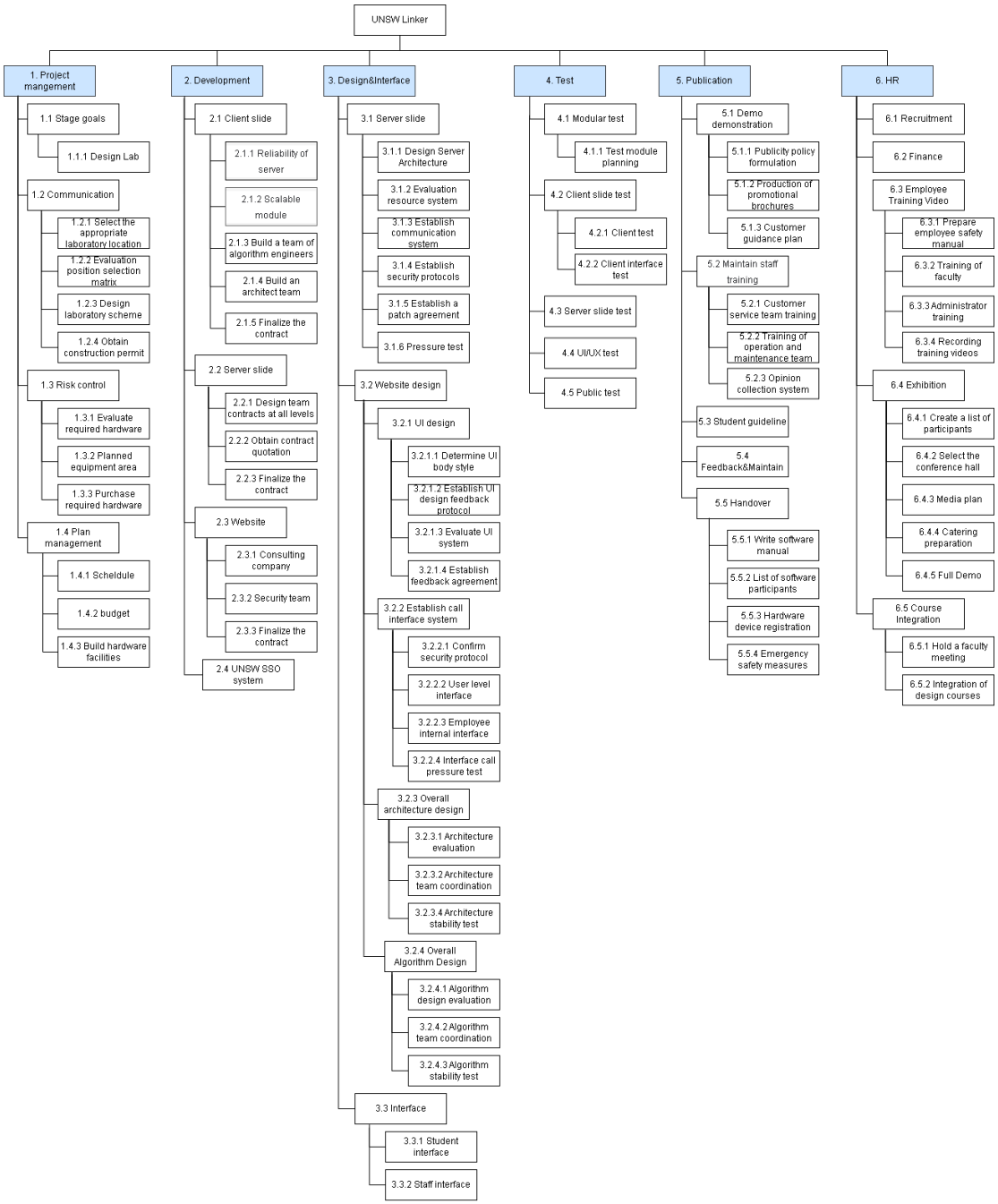
2.1 Overview

We use 6 major sub-deliverables to form a brief WBS diagram, brief WBS provides a clearer classification of deliverables and specific subgraphs. The sub-deliverables and work packages are presented in more detail in the concluding appendix section of the report.

2.2 WBS Diagram



2.3 Project Work Breakdown Structure



2.4 Budget table

We divide the budget into two parts: the expected cost and the emergency reserve budget, where the expected cost refers to the estimated cost of the deliverable project in the actual

project. In addition, considering the uncertain factors in the actual project, we will design for emergency reserve budget, 10% of the final budget for each deliverable are independent of each other, part of the emergency reserve budget amount shall not exceed 10% of the expected cost, thus reducing funds shortage due to various factors in practical engineering problems such as not timely delivery.

	WBS Deliverables	Expect Cost	contingency reserve budget	Total cost
1	Project mangement		10000	
2	Development		54305	
2.1	Client slide	14520	1452	15972
2.2	Server slide	19360	1936	21296
2.3	Website	14520	1452	15972
2.4	UNSW SSO system	968	97	1065
3	Design&Interface		58564	
3.1	Server slide	19360	1936	21296
3.2	Website design	29040	2904	31944
3.3	Interface	4840	484	5324
4	Test		63903	
4.1	Modular test	29054	2905	31959
4.2	Client slide test	9680	968	10648
4.3	Server slide test	9680	968	10648
4.4	UI/UX test	4840	484	5324
4.5	Public test	4840	484	5324
5	Publication		35139	
5.1	Demo demonstration	5808	581	6389
5.2	Maintain staff training	13552	1355	14907
5.3	Student guideline	5808	581	6389
5.4	Feedback&Maintain	6776	678	7454
6	HR		65560	
6.1	Recruitment	9600	960	10560
6.2	Finance	50000	5000	55000
288455				

Our final cost totaled $288455, which is the result of considering all the scenarios.

3. Estimates of Time and Cost

3.1 cost estimation

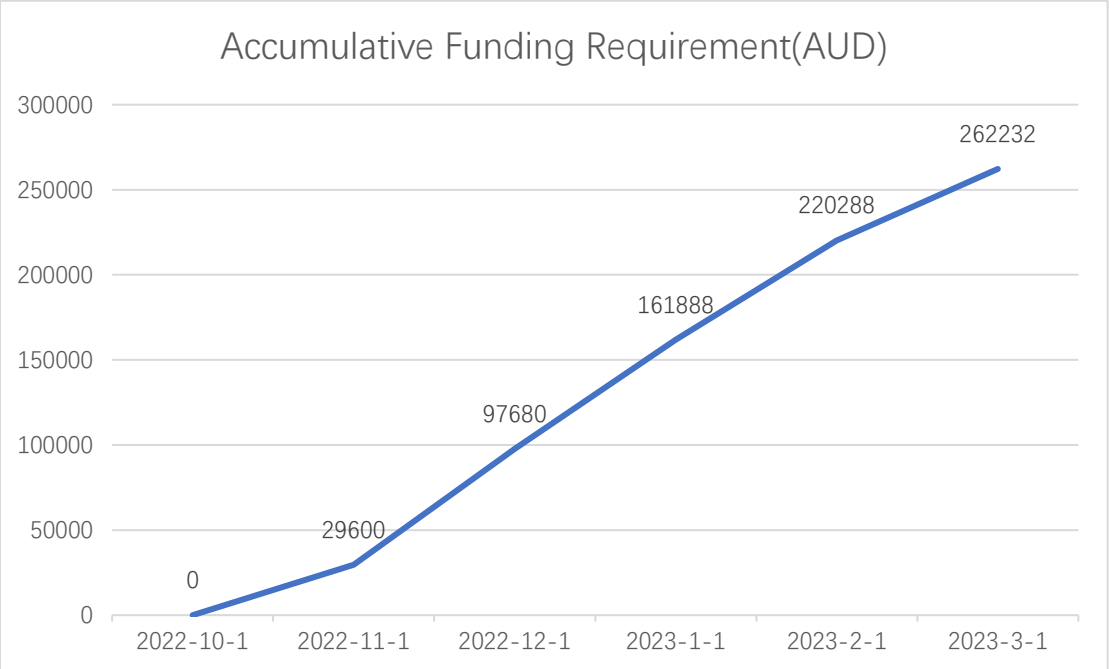
Cost and time estimating is very important for a project to ensure that we are able to deliver the project on time and complete the project successfully.

The Project Manager (PM) will be responsible for managing and reporting on the project's cost throughout the duration of the project.

Using a bottom-up approach based on the WBS for this project, we estimated the cost and duration of each activity in the project. Total cost is AU$262232. The duration of the entire project is 5 months.

1	work package	cost($)	Activity start	Activity end	Duration (days)
1	Recruitment	9600	30-Sep-22	30-Oct-22	30
2	Facilities	10000	1-Oct-22	11-Oct-22	10
3	Finances	50000			ongoing
4	client slide	14520	2022/10/31	2022/11/14	15
5	Server build	19360	2022/11/15	2022/12/4	20
6	website	14520	2022/12/5	2023/12/20	15
7	unsw sso system	968	2023/12/20	2023/12/21	1
8	UI design	19360	2022/10/31	2022/11/20	20
9	website design	29040	2022/11/21	2022/12/20	30
10	interface	4840	2022/12/22	2022/12/31	10
11	modular test	29040	2022/12/21	2023/1/20	30
12	client slide test	9680	2023/1/1	2023/1/10	10
13	server slide test	9680	2023/1/11	2023/1/20	10
14	UI test	4840	2023/1/21	2023/1/30	10
15	public test	4840	2023/1/21	2023/1/30	10
16	demo demonstration	5808	2023/1/31	2023/2/5	6
17	guideline	5808	2023/1/31	2023/2/5	6
18	feedback	6776	2023/2/6	2023/2/12	7
19	handover	0	2023/2/13	2023/2/15	3
20	training	13552	2023/2/15	2023/2/28	14

3.2 Time Phased Budget and Project Contingency Reserve Plan



The graph represents the accumulated funding requirements. The total given fund is AUD $300000.

3.3 Per Month Funding Requirements

funding due date	funding requirement(AUD)	Accumulative Funding Requirement(AUD)
2022/9/30	0	0
2022/10/30	29600	29600
2022/11/30	68080	97680
2022/12/30	64208	161888
2023/1/30	58400	220288
2023/2/28	41944	262232

The second line is the requirement fund per month and the third line is the accumulative funding in per stage. The total requirement is accumulated about AUD$181381.

3.4 Detailed Budget and Schedule

*	work package	activity	Activity start	Activity end	Duration (days)	cost($)
6.1	Recruitment	Develop position descriptions and publicly advertise	2022/9/30	2022/10/20	20	6400
		Select applicants and authorize employment	2022/10/21	2022/10/30	10	3200
	Facilities	Prepare computers used in the work	2022/10/1	2022/10/11	10	10000
6.2	Finances	Include paperwork, the salary of project management and so on			ongoing	50000
2.1	client slide	Back-end development engineer build the client slide	2022/10/31	2022/11/14	15	14520
2.2	Server build	Back-end development engineer build the server slide	2022/11/15	2022/12/4	20	19360
2.3	website	Back-end development engineer build the fundamental structure of the website	2022/12/5	2023/12/20	15	14520
2.4	UNSW SSO system	connect the program with UNSW SSO system	2023/12/20	2023/12/21	1	968
3.1.1	UI design	Front-end development engineer designs the UI of website	2022/10/31	2022/11/20	20	19360
3.2	website design	Front-end development engineer designs the entire website	2022/11/21	2022/12/20	30	29040

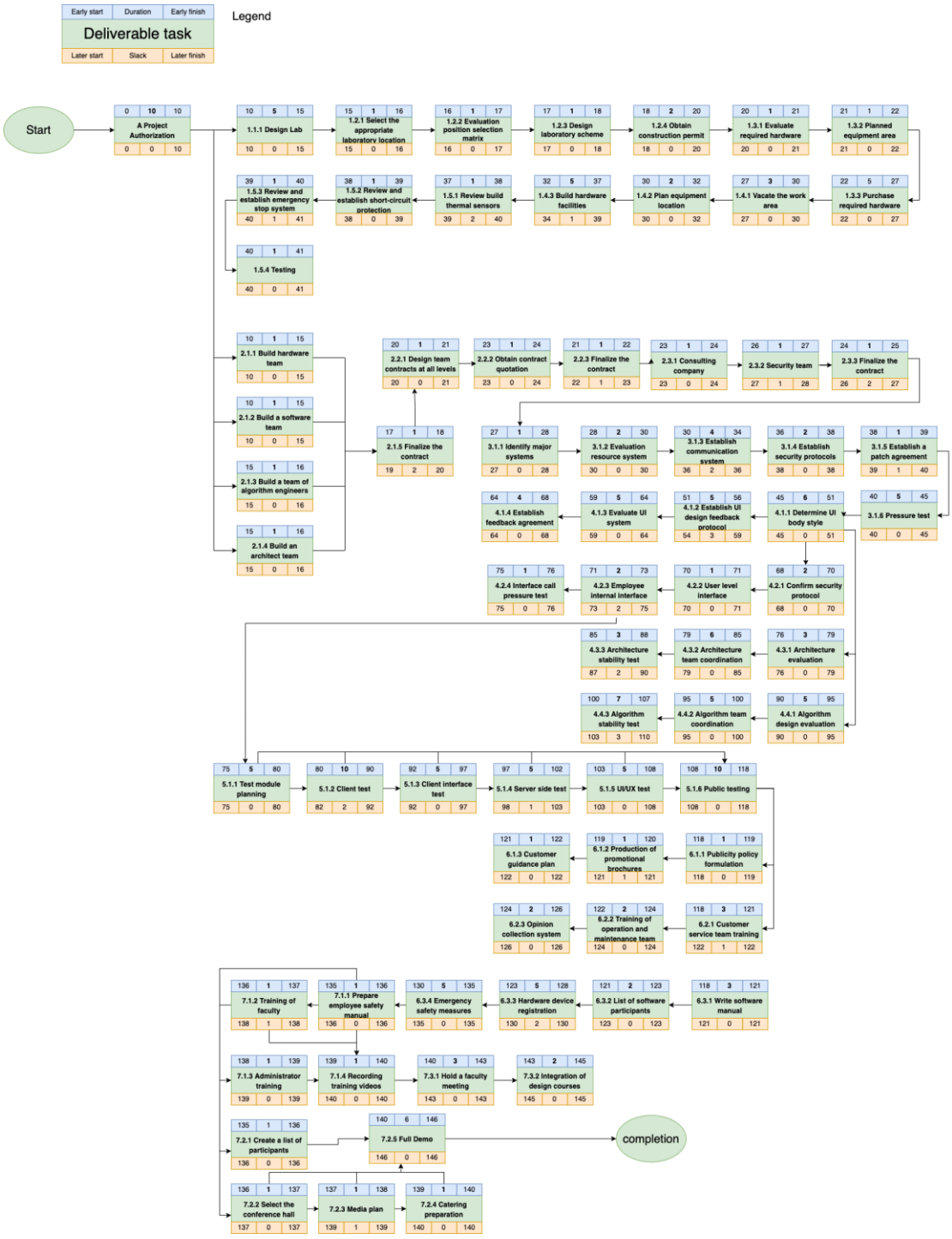
3.3	interface	Back-end development engineer write the interface of the program	2022/12/22	2022/12/31	10	4840
4.1	modular test	Testing Engineer test every modular	2022/12/21	2023/1/20	30	29040
4.2	client slide test	Testing Engineer test client slide	2023/1/1	2023/1/10	10	9680
4.3	server slide test	Testing Engineer test server slide	2023/1/11	2023/1/20	10	9680
4.4	UI test	Testing Engineer test UI	2023/1/21	2023/1/30	10	4840
4.5	public test	Testing Engineer test the entire software	2023/1/21	2023/1/30	10	4840
5.1	demo demonstration	demo demonstration	2023/1/31	2023/2/5	6	5808
5.3	guideline	write the student guideline to prevent the awful result caused by the incorrect operation	2023/1/31	2023/2/5	6	5808
5.4	feedback	UNSW give the feedback about the software. After that, correct and maintain the software	2023/2/6	2023/2/12	7	6776
5.5	handover	handover the entire system to UNSW	2023/2/13	2023/2/15	3	0
5.2	training	Trainer teaches the receiver how to operate the system	2023/2/15	2023/2/28	14	13552
total						262232

4. Network Diagram

4.1 Overview

We use the bottom-up method based on project WBS to estimate the cost of different activities in the project and create network diagram. Through the network diagram, when a certain work is completed in advance or delay, it can be calculated to determine its impact on the whole schedule and through information feedback, quickly make judgments and necessary adjustments, and always implement effective supervision and control of the plan.

4.2 Network diagram

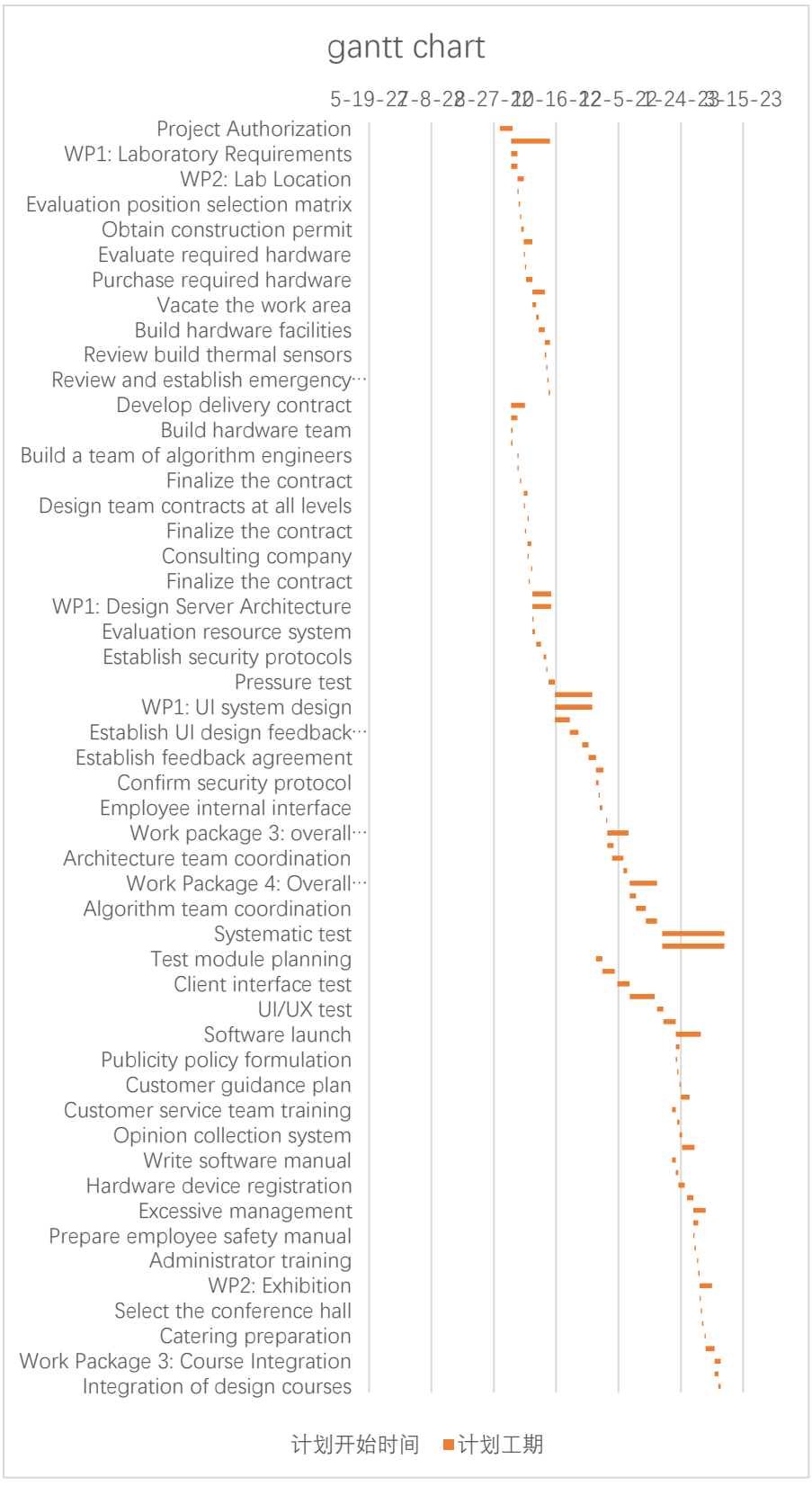


5. Schedule

5.1 Schedule chart

ID	Description	Preceding Activity	Duration	Early Start	Early Finish	Late Start	Late Finish	Total Slack
~	**Project Start**	~	~	~	~			
A	Project Authorization	None	10	0	10	0	10	0
1	Development and delivery laboratory		31	10	41	10	41	0
1.1	WP1: Laboratory Requirements		5	10	15	10	15	0
1.1.1	Design Lab	A	5	10	15	10	15	0
1.2	WP2: Lab Location		5	15	20	15	20	0
1.2.1	Select the appropriate laboratory location	1.1.1	1	15	16	15	16	0
1.2.2	Evaluation position selection matrix	1.2.1	1	16	17	16	17	0
1.2.3	Design laboratory scheme	1.2.2	1	17	18	17	18	0
1.2.4	Obtain construction permit	1.2.3	2	18	20	18	20	0
1.3	WP3: Hardware procurement		7	20	27	20	27	0
1.3.1	Evaluate required hardware	1.2.4	1	20	21	20	21	0
1.3.2	Planned equipment area	1.3.1	1	21	22	21	22	0
1.3.3	Purchase required hardware	1.3.2	5	22	27	22	27	0
1.4	WP4: laboratory room construction		10	27	37	29	39	2
1.4.1	Vacate the work area	1.3.3	3	27	30	27	30	0
1.4.2	Plan equipment location	1.4.1	2	30	32	30	32	0
1.4.3	Build hardware facilities	1.4.2	5	32	37	34	39	1
1.5	WP5: Security Mechanism		4	37	41	37	41	0
1.5.1	Review build thermal sensors	1.4.3	1	37	38	39	40	2
1.5.2	Review and establish short-circuit protection	1.5.1	1	38	39	38	39	0
1.5.3	Review and establish emergency stop system	1.5.2	1	39	40	40	41	1
1.5.4	Testing	1.5.1, 1.5.2, 1.5.3	1	40	41	40	41	0
2	Develop delivery contract		11	10	21	10	10	0
2.1	Work Package 1: Engineering Team Contract		5	10	15	10	20	0
2.1.1	Build hardware team	A	1	10	15	10	15	0
2.1.2	Build a software team	A	1	10	15	10	15	0
2.1.3	Build a team of algorithm engineers	A	1	15	16	15	16	0
2.1.4	Build an architect team	A	1	15	16	15	16	0
2.1.5	Finalize the contract	2.1.1, 2.1.2, 2.1.3, 2.1.3	1	17	18	19	20	2
2.2	WP2: Contracts for Teams at All Levels		3	20	23	20	23	0
2.2.1	Design team contracts at all levels	2.1.5	1	20	21	20	21	0
2.2.2	Obtain contract quotation	2.2.1	1	23	24	23	24	0
2.2.3	Finalize the contract	2.2.2	1	21	22	22	23	1
2.3	Work Package 3: Outsourcing Contract		3	23	26	23	26	0
2.3.1	Consulting company	2.2.3	1	23	24	23	24	0
2.3.2	Security team	2.3.1	1	26	27	27	28	1
2.3.3	Finalize the contract	2.3.2	1	24	25	26	27	2
3	Development Delivery Server		15	27	42	27	42	0
3.1	WP1: Design Server Architecture		15	27	42	27	42	0
3.1.1	Identify major systems	2.3.3	1	27	28	27	28	0
3.1.2	Evaluation resource system	3.1.1	2	28	30	30	30	0
3.1.3	Establish communication system	3.1.2	4	30	34	36	36	2
3.1.4	Establish security protocols	3.1.3	2	36	38	38	38	0
3.1.5	Establish a patch agreement	3.1.4	1	38	39	39	40	1
3.1.6	Pressure test	3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5	5	40	45	40	45	0
4	Website Design		55	45	100	45	100	0
4.1	WP1: UI system design		20	45	65	45	65	0
4.1.1	Determine UI body style	3.1.6	6	45	51	45	51	0
4.1.2	Establish UI design feedback protocol	4.1.1	5	51	56	54	59	3
4.1.3	Evaluate UI system	4.1.2	5	59	64	59	64	0
4.1.4	Establish feedback agreement	4.1.3	4	64	68	64	68	0
4.2	WP2:Establish call interface system		6	68	74	68	74	0
4.2.1	Confirm security protocol	4.1.1	2	68	70	68	70	0
4.2.2	User level interface	4.2.1	1	70	71	70	71	0
4.2.3	Employee internal interface	4.2.2	2	71	73	73	75	2
4.2.4	Interface call pressure test	4.2.3	1	75	76	75	76	0
4.3	Work package 3: overall architecture design		12	76	88	76	88	0
4.3.1	Architecture evaluation	4.1.1	3	76	79	76	79	0
4.3.2	Architecture team coordination	4.3.1	6	79	85	79	85	0
4.3.3	Architecture stability test	4.3.2	3	85	88	87	90	2
4.4	Work Package 4: Overall Algorithm Design		17	90	107	90	107	0
4.4.1	Algorithm design evaluation	4.1.1	5	90	95	90	95	0
4.4.2	Algorithm team coordination	4.4.1	5	95	100	95	100	0
4.4.3	Algorithm stability test	4.4.2	7	100	107	103	110	3
5	Systematic test		40	75	115	75	115	0
5.1	Work Package 1: Modular Testing		40	75	115	75	115	0
5.1.1	Test module planning	4.2.3	5	75	80	75	80	0
5.1.2	Client test	5.1.1	10	80	90	82	92	2
5.1.3	Client interface test	5.1.2	5	92	97	92	97	0
5.1.4	Server side test	5.1.3	5	97	102	98	103	1
5.1.5	UI/UX test	5.1.4	5	103	108	103	108	0
5.1.6	Public testing	5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.1.5	10	108	118	108	118	0
6	Software launch		20	118	138	118	138	0
6.1	Work Package 1: Software Demonstration		3	118	121	118	121	0
6.1.1	Publicity policy formulation	5.1.6	1	118	119	118	119	0
6.1.2	Production of promotional brochures	6.1.1	1	119	120	121	121	1
6.1.3	Customer guidance plan	6.1.2	1	121	122	122	122	0
6.2	WP2:Customer service team		7	118	125	125	125	0
6.2.1	Customer service team training	5.1.6	3	118	121	122	122	1
6.2.2	Training of operation and maintenance team	6.2.1	2	122	124	124	124	0
6.2.3	Opinion collection system	6.2.2	2	124	126	126	126	0
6.3	WP3:Software handover		10	118	128	128	128	
6.3.1	Write software manual	5.1.6	3	118	121	121	121	0
6.3.2	List of software participants	6.3.1	2	121	123	123	123	0
6.3.3	Hardware device registration	6.3.2	5	123	128	130	130	2
6.3.4	Emergency safety measures	6.3.3	5	130	135	135	135	0
7	Excessive management		10	135	145	145	145	0
7.1	Work Package 1: Employee Training Video		4	135	139	139	139	0
7.1.1	Prepare employee safety manual	6.3.4	1	135	136	136	136	0
7.1.2	Training of faculty	7.1.1	1	136	137	138	138	1
7.1.3	Administrator training	7.1.2	1	138	139	139	139	0
7.1.4	Recording training videos	7.1.1, 7.1.2, 7.1.3	1	139	140	140	140	0
7.2	WP2: Exhibition		10	135	145	145	145	0
7.2.1	Create a list of participants	6.3.4	1	135	136	136	136	0
7.2.2	Select the conference hall	7.1.1	1	136	137	137	137	0
7.2.3	Media plan	7.2.2	1	137	138	139	139	1
7.2.4	Catering preparation	7.2.3	1	139	140	140	140	0
7.2.5	Full Demo	7.2.1, 7.2.2, 7.2.3, 7.2.4	6	140	146	146	146	0
7.3	Work Package 3: Course Integration		5	140	145	145	145	0
7.3.1	Hold a faculty meeting	7.1.4	3	140	143	143	143	0
7.3.2	Integration of design courses	7.3.1, 7.3.2	2	143	145	145	145	0
R	Review project		5	145	150	145	150	0
~	**Project completion**							

5.2 Gantt chart



6. Stakeholder Management

6.1 Overview

Completing the construction of the UNSW online platform requires consideration of the composition of stakeholders. The project drives the realization of the entire project by identifying stakeholders.

6.2 Stakeholder Management Plan

Stakeholder	Category	Interest(0-3)	Influence(0-3)	Roles	Communication Channel
UNSW management	Primary	3	3	Fully function and demand of UNSW online platform.	Phone call updates for high level milestones. Weekly Teams meeting.
Project management Team	Secondary	2	3	Project life cycle management, including requirements, plans, progress, quality, risk and cost management.	daily Teams meeting.
design engineers,developer	Secondary	1	3	Complete the project	daily Teams meeting.
students	Secondary	2	2	A group of indirect stakeholders who gain a better experience with the online platform.	Feedback forms
staffs	Secondary	2	2	A group of indirect stakeholders who gain a better experience with the online platform.	Feedback forms
suppliers	Tertiary	1	1	on time payments for the equipment	contract negotiations, Phone calls for urgent communications
other school	Teritary	1	1	Provide references and opinions for the platform	email

6.3 Stakeholder Engagement Matrix

The stakeholder engagement matrix facilitates and improves a project's stakeholder management significantly. It helps identify potential gaps in the involvement of stakeholders.

The stakeholders always have five positions: resistant, unaware, neutral, supportive and leading. The matrix below listing all possible stakeholders and involving the current position and desired position of them.

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
UNSW management				CD	
Project management Team				C	D
design engineers,developer			C		D
students	C			D	
staffs	C			D	
other school	C		D		
suppliers	C		D		

C=Current position

D=Desired position

7. Human Resource Plan

7.1 Overview

The Human Resource Plan outlines how to estimate, acquire, manage, and utilize the human resources required to carry out the program.

Accessing human resources should be based on the UNSW Employment Policy. The entire HR acquisition process needs to be carried out before the project starts. The time required about half a month to a month. The process covered during this period includes publishing recruitment requirements, screening suitable interview resumes, interviewing, and issuing offers to candidates who meet the requirements of the field. The positions that need to be recruited for the completion of the project are: project manager, front-end development engineer, back-end development engineer, UI design engineer, testing engineer, trainer, Operation and Maintenance and HR. The staff of the project team will try to be recruited from the staff of the University of New South Wales, which will allow the relevant staff to solve the problem more quickly when the project is officially put into operation.

7.2 Estimating Human Resources Requirements

To estimate the human resources required for the project, the project will use a bottom-up estimating method to develop the personnel required for each phase of the project, using the budget as the main reference. According to estimates, a project manager needs to be recruited before the project starts, development engineers, design engineers, and test engineers need to be recruited at the project establishment stage. After the project is completed, a trainer is required to finish the handover function.

7.3 Acquiring Human Resources

7.3.1 Orientation

On-boarding and orientation training will be conducted by UNSW Human Resources to educate staff on project requirements and staff management that need to notice during the project. Working equipment (such as laptops, servers, etc.) will be provided to employees at the end of the orientation.

7.3.2 Job descriptions

For members of the team that need to be recruited, the following job descriptions will be

send to UNSW HR. The job roles and the descriptions are all refer to the recruitment platform Linkedin (Linkedin, 2022)

Position: Project Manager

Role: Responsible for the full life cycle management of the project, including requirements, planning, progress, quality, risk and cost management. Monitor key project milestones, coordinate internal resources, and ensure project delivery on time. Identify and control project risks, coordinate solutions, and ensure the quality of project delivery.

Attributes: Successful applicants should have relevant qualifications and at least 3 years of project management experience in similar projects. They need to possess leadership skills to lead a team in a work environment, as well as strong organizational, communication and problem-solving skills. They will be very detail-oriented and can effectively manage multiple workflows and conflicting deadlines.

Position: Front-end development engineer

Role: Engage in web front-end development of UNSW website system applications, and participate in requirements analysis, system design, coding implementation, and investigation and writing of related technical documents in the process of web front-end development.

Attributes: Proficient in JavaScript, CSS, HTML and other front-end technologies, master at least one mainstream front-end framework (Angular/React/Vue, etc.), have actual project development experience, understand the back-end technology stack, and have back-end development experience will be preferred.

Position: Back-end development engineer

Role: Complete the design and development of the business back-end according to business requirements or architectural design documents; design related interfaces to connect with the front-end interface.

Attributes: Successful applicants should be familiar with at least one programming language such as java/C++/Linux shell/python, have good programming habits, understand the use of mainstream R&D frameworks, CI/CD tools, common middleware, etc. The applicant also needs to express Clear logic, good at communication and coordination, responsible, practical, diligent and eager to learn, and love technology; applicants who can read the source code or understand the principle of the source code are preferred.

Position: Testing Engineer,

Role: Successful applicants write test cases and build a test environment based on requirements documents and design test documents; and complete product integration testing and system testing; after testing is completed, perform tests according to test cases, and feedback and track product and use case defects.

Attributes: Successful applicants should master basic testing theory knowledge, understand software testing methods and processes, have a keen sense of potential risks, understand at least one programming language such as C++, Shell, Python, Java, be serious and responsible, have good communication skills and teamwork Spirit.

Position: Trainer

Role: The trainer will build the training system and demonstrate the functionality of the website for UNSW staff and students. And the trainer also needs to collect user feedback and provide it to the developers so that they can improve the requirements and enhance the user experience.

Attributes: Successful applicants will have at least 3 years of work experience in the field and strong oral communication skills.

Position: O&M (Operation and Maintenance)

Role: Responsible for cooperating with the daily maintenance of computer equipment and networks, as well as the installation, configuration and deployment of common working software and systems. Responsible for daily network troubleshooting to ensure system stability. Assist engineers to complete the implementation of network debugging and deployment.

Attributes: Understand basic network knowledge, such as IP, mask, gateway, broadcast, address classification, etc. Understand mainstream operating systems, such as windows server; Linux, can independently install the operating system according to the manual. Have network fault analysis, judgment, and resolution Ability to coordinate and communicate.

Position: HR (Human Resource)

Role: Assist with recruitment process, such as interview appointment, communicate with project staff. Connect with financial and other departments to ensure the smooth progress of human resources affairs.

Attributes: Strong communication skills, strong sense of responsibility, patient and meticulous, rigorous and practical

8. Managing Human Resources

8.1 Communication Plan

As the main communication tool of UNSW (UNSW IT, 2022), employees will use Teams as the main communication tool at work (if there is a problem with the Teams software, they can also use email to communicate temporarily), and the project administrator will set up a Teams channel and let all employees join the channel.

Since this project is a common website development project, the project team will adopt the working environment of agile development that is now common in society. The project team will meet every morning to discuss the problems encountered and the direction of the next day's tasks.

8.2 Location

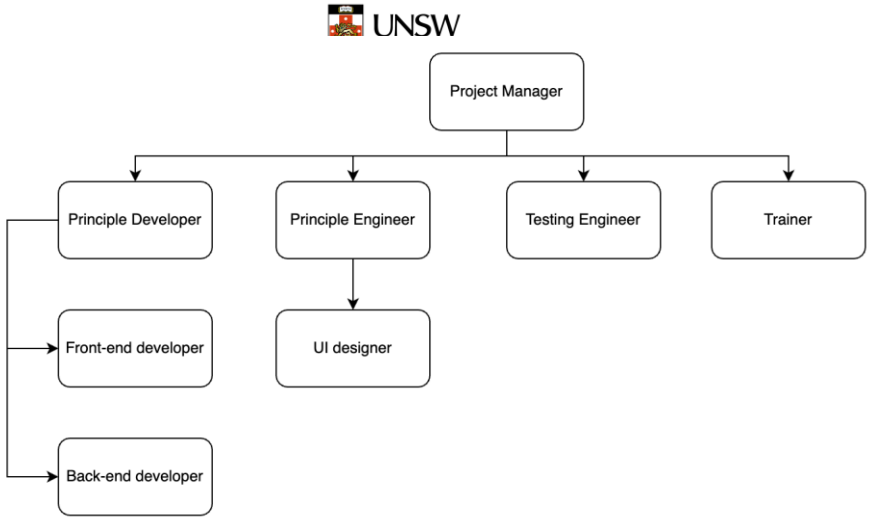
Employees will use Teams as the main communication tool at work (if there is a problem with the Teams software, they can also use email to communicate temporarily), and the project administrator will set up a Teams channel and let all employees join the channel.

Since this project is a common website development project, the project team will adopt the working environment of agile development that is now common in society. The project team will meet every morning to discuss the problems encountered and the direction of the next day's tasks.

8.3 Human Roles and Responsibilities

8.3.1 Organization chart

The organization chart is as follows. As the chart, it can be seen that the project manager shall manage all member of the team, while principle developers, principle engineers and testing engineers responsible for the specific implementation of the project, project administrator responsible to monitor project progress and budget allocation, contract administrator responsible for managing all expenses related matters and trainers need to guide the people to use the finished project.



8.3.2 RACI chart

The RACI chart as follows point out the detailing of the roles and the responsibilities of the project for each project members.

				Project Team						
1	UNSW Linker			Poject Manager	Principle Developer	Principle Engineer	Testing Engineer	Trainer	O&M	HR
	1.1		**Project Management**							
		1.1.1	Stage Goals	AR	I	I	I		I	I
		1.1.2	Communication	AR	I	I	I		I	I
		1.1.3	Risk control	AR						I
		1.1.4	Plan management	AR	I	I	I			I
	1.2		**Development**							
		1.2.1	Client-side	A	R	I	I		I	
		1.2.2	Server-side	A	R	I	I		I	
		1.2.3	Website	A	R	I	I		I	
		1.2.4	UNSW SSO system	A	R	I	I		I	
	1.3		**Design&Interface**							
		1.3.1	Server-side design	A	I	R	I		I	
		1.3.2	Website design	A	I	R	I		I	
		1.3.3	Interface	A	R		I		I	
	1.4		**Test**							
		1.4.1	Modular test	A	I	I	R		I	
		1.4.2	Client-side test	A	I	I	R		I	
		1.4.3	Servver-side test	A	I	I	R		I	
		1.4.4	UI/UX test	A	I	I	R		I	
		1.4.5	Public test	A	I	I	R		I	
	1.5		**Publication**							
		1.5.1	Dmo demonstration	A	C			R		
		1.5.2	Maintain staff training	A	C			R		
		1.5.3	Student guideline	A	C			R		
		1.5.4	Feedback&Maintain	A	C			R		
	1.6		**Human Resouce**							
		1.6.1	Recruitment	AC						R
		1.6.2	Finance	ARC						

9. Risk Management Plan

9.1 Risk Identification

The risk management team uses the method of decomposing the risk structure to identify and classify risks. Through risk assessment, emergency management mechanism is established and realized through risk matrix.

9.2 Project risk

	description
Impact caused by Covid-19	Due to Covid-19, government may take some measures and project developers could not work off-line
Delay in recruitment	Spending too long time to recruit employees
Training Risk	new members are not trained and do not know how to work
problem between Team	If the project manager is unable to coordinate the tasks of each member in the project, an uneven division of labour must happen.
Software bugs	software bugs in the program may cause errors of the server.
operation risk	If users do not follow the operating procedures, which can lead to unpredictable things that could affect the project schedule.
confused purpose	The purpose and need of the project i s not well-defined.
shortage of time	Project schedule is too tight to meet the project deadline.
loss of code	Loss of program code due to various reasons, such as network failure, human error.
Manager leave	The project manager may get new job and higher salary and leave the project.
supply chain	the supply chain is interrupted during the progress of purchase, which leads to the shortage of equipment.
insufficient funds	budget is insufficient or the actual discrepancies are too great to support the whole project.
hardware facilities	hardware facilities were not available on time during the server and lab set-up process.
Negative inactivity	hired professors are unwilling to contribute to the software system for some reasons
Server hardware equipment	Sudden accidents on some hardware equipment
Equipment does not meet specifications	The quality of equipment procured by some suppliers is not sufficient to meet the requirements of use.
evaluation of models	Insufficient staff to follow up on the use and evaluation of the model, leading to large deviations in later projects
Contrary to the laws	As the project involves the personal privacy of students and staff, it can easily violate the law.
Security measures	Some employees fail to take safety precautions for reasons such as slacking off
Construction nuisance	Construction work was halted due to complaints of nuisance to neighbours

9.3 Contingency Planning

If some risks are inevitable, some contingency plans should be taken.

Contingency Planning

Technical risk If team members cannot protect MM cell which meet the requirements,

communicate urgently with UNSW, and add more team members who have related knowledge, which may increase the funding budget.

Contingency Planning

Contingency Funding Notify the university in advance that emergency backup funds may be required, if the allocated budget cannot cover the cost of the project, urgently apply to the school for backup funds.

Contingency Planning

Time Buffers 18 Plan extra flexible task time and funding when scheduling tasks, if model or workshop does not complete on time, using extra task time and funding to finish task.

9.4 Risk Assessment

		Consequence				
		Negligible 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Likelihood	5 Almost certain	Moderate 5	High 10	Extreme 15	Extreme 20	Extreme 25
	4 Likely	Moderate 4	High 8	High 12	Extreme 16	Extreme 20
	3 Possible	Low 3	Moderate 6	High 9	High 12	Extreme 15
	2 Unlikely	Low 2	Moderate 4	Moderate 6	High 8	High 10
	1 Rare	Low 1	Low 2	Low 3	Moderate 4	Moderate 5

9.5 Risk Register

Risk ID	Risk description	Probability p(x) =1~5	Impact(severity) f(x) =1~5	Ranking	Mitigating or avoiding action	Action by:
1	Impact caused by Covid-19	4	5	8	Project participants can't work offline, so some projects can be carried out online. The project manager needs to priorities the progress of some projects according to the project time plan.	External Risks
2	Delay in recruitment	4	5	7	Advertise job in advance and expand the scope of recruitment	HR
3	Training Risk	4	4	7	We could find freelancers to be employed. It may increase the budget. However, it can solve the lack of human resources.	HR
4	the problem between project Team	3	4	7	The right project manager has to be chosen. Maintain communication between each member throughout the process of the project.	HR
5	Software bugs	3	4	7	Install a emergency button to reset the program when something goes wrong, thus protecting it from crashing.	Operation and maintenance
6	operation risk	5	3	6	Write operation documentation. Before using the program, the user is required to fully understand the entire operation process.	Operation and maintenance
7	confused purpose	4	3	6	Communicate with project management and UNSW usually to clear the project Purpose and need of UNSW.	project management
8	time is not enough	4	5	6	Hold scheduling workshops with the entire project team to ensure the project progress. Share the schedule with each other.	project management
9	loss of code	3	4	6	Regular backups of program code to reduce the risk.	Development Department
10	Project Manager leave	3	4	6	Ensure a contract is in place. Provide the right benefits package for employees.	HR
11	The supply chain is interrupted and it is difficult to purchase equipment	3	4	6	Hold a seminar in advance to prepare multiple backup plans, prepare a list of backup materials, and timely replace the backup options in case of products that cannot be purchased.	project management
12	Insufficient funds to support project costs	4	3	6	Do a good job of time planning in advance and reserve some flexible time to ensure the complete operation of the project	Finance Department
13	Hardware facilities used in the project were not prepared on time	3	3		Plan the time in advance and reserve some flexible time to ensure the complete operation of the project.	project management
14	The professor is unwilling to contribute to the software system	3	3	5	Before recruitment, do a good job of background investigation and evaluation of the employees, and try to avoid this	HR
15	Server hardware equipment accident	4	3	5	Do a good job of risk assessment and risk prediction in advance, and sort out the handling methods in case of unexpected accidents	Security experts
16	The equipment purchased from the supplier cannot meet the specification	4	2	5	Fully evaluate and observe the required equipment in advance, try to select products that meet the requirements, and prepare alternative options.	project management

17	No relevant personnel followed up the use and evaluation of the model	4	2	4	HR and engineering teams will investigate and recruit model evaluators in advance to ensure the complete operation of the project.	HR
18	Part of the project involves personal privacy, which may violate the laws and regulations of New South Wales Week	2	2	4	Fully consider the requirements within the scope allowed by the law, strictly evaluate the sensitive information involved in each step of the project, and check at all levels to ensure that the information is not leaked.	legal department
19	Not all employees follow safety guidelines and not all safety measures are in place	1	1	3	Make a survey of employees in advance to ensure that responsible employees are on duty.	HR
20	Disturbance of construction to the surrounding environment	2	1	2	Plan the construction time, take sound insulation measures, and try to avoid affecting the normal life of neighbors. In case of complaints, actively communicate and solve the problems, and pacify the mood	project management

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