



University of South Australia

SCHOOL OF ELECTRICAL AND INFORMATION ENGINEERING

Electrical and Information Engineering Project

2010g PLC Development

Project Plan

ver 1.0

Students

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Supervisors

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Version

Version	Changes	Date
Ver. 1.0	Project Plan Draft	30/04/2010

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Assessment Agreement

We, the students and supervisor(s) named on the front cover of this Project Plan agree that the project as described in this Project Plan shall be the objectives against which the students are assessed in the courses the students are enrolled in to perform this project.

Michael Kellow

James Kemp

Kathleen Manuel

Statement of Work

The project is to develop a programmable logic controller (PLC) based on existing PLC systems available in the market. With the funding assistance from the School of Electrical and Information Engineering, we are to develop a system that meets the following criteria:

- New and easy to use for educational purposes (secondary and university students)
- Can be expandable so that it can be easily modified to be used in industry
- Have the same capabilities in terms of speed, interface, reliability and applications to that of an industrial PLC.
- Cost effective

The PLC development project will be delivered by the end of study period 5, 26th November 2010.

Work breakdown structure

Schedule

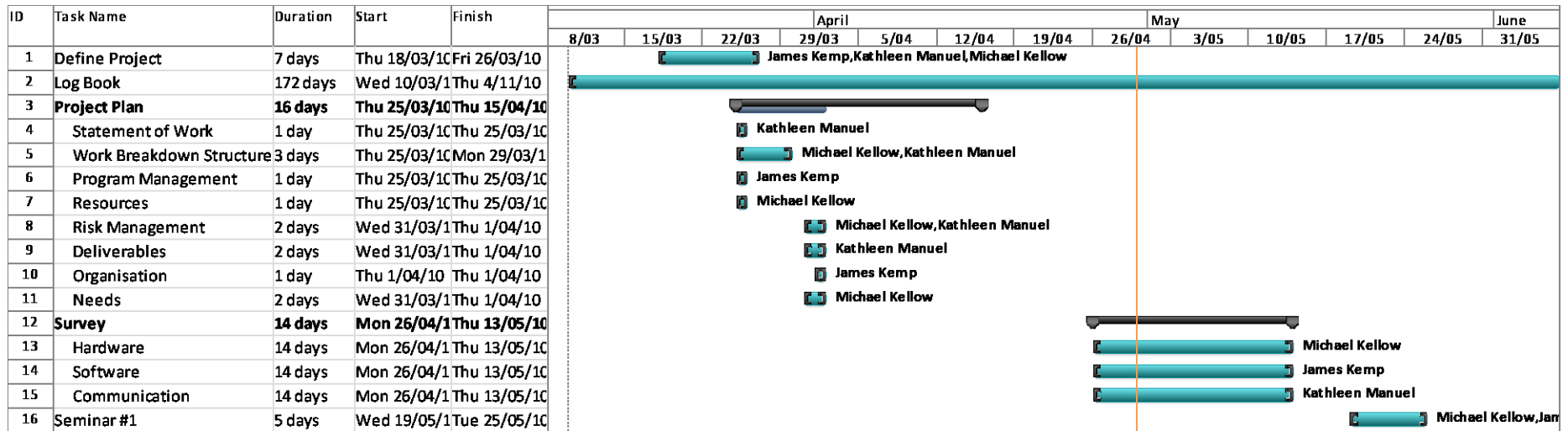


Figure 1: Actual Work Schedule Study Period 2, 2010

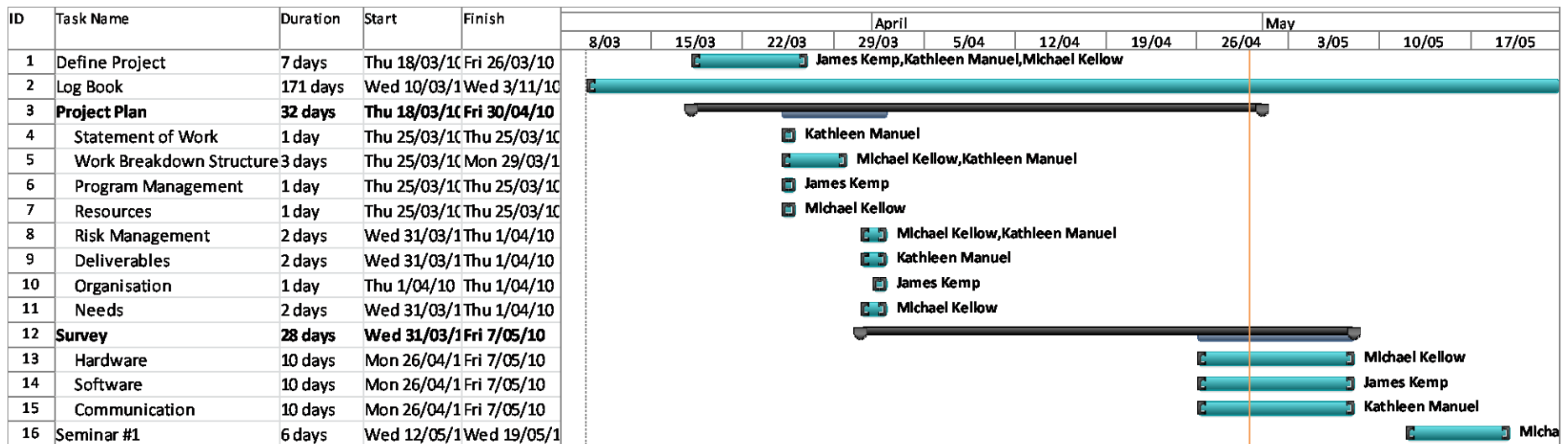


Figure 2: Projected Work Schedule Study Period 2, 2010

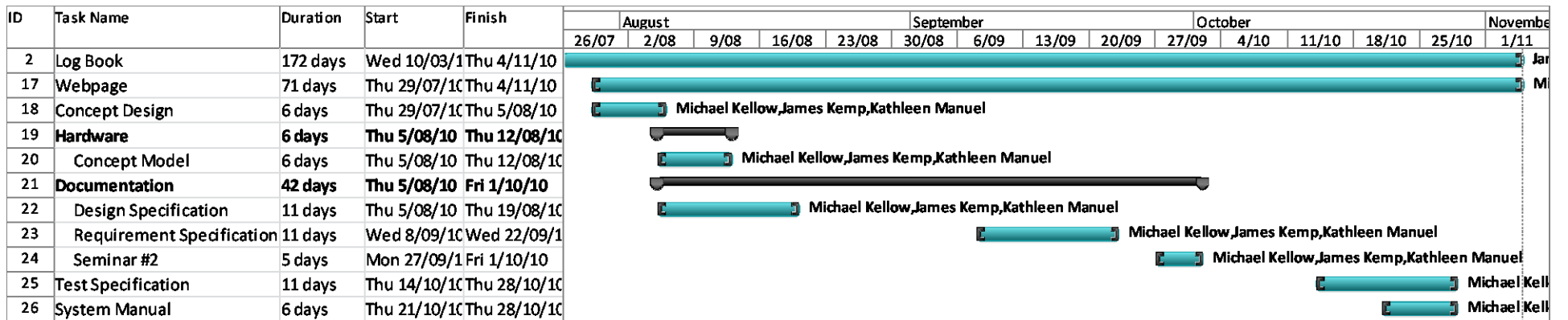


Figure 3: Actual Work Schedule Study Period 5, 2010

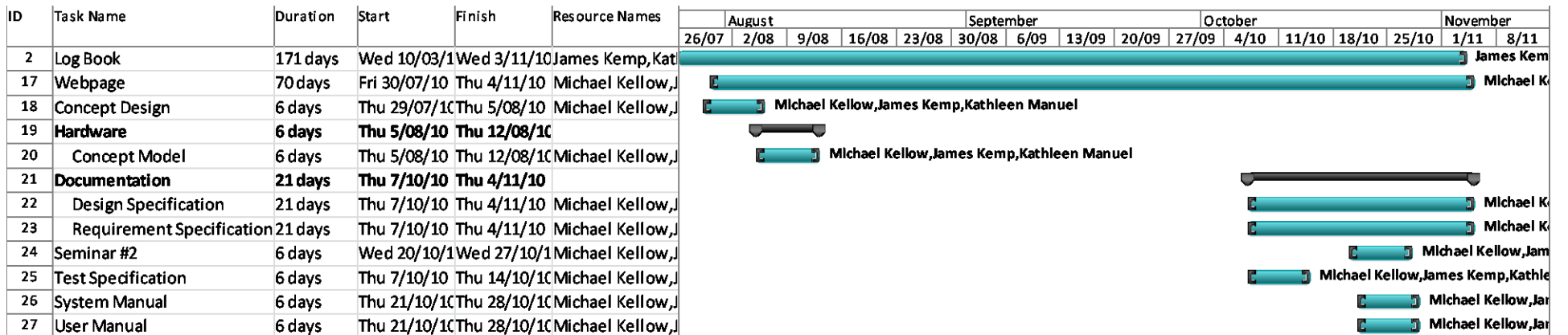


Figure 4: Projected Work Schedule Study Period 5, 2010

Cost

The only foreseeable costs for this project are for the construction of the prototype and printing of documentation.

The budget for the project is \$250- per group member, totalling \$750- for the entire project. An estimate of the cost breakdown can be seen in the Table 1 below.

Table 1: Project Cost Breakdown

Item	Cost
Prototype Construction	\$700
Printing	\$50
Total	\$750

This is just an estimate of the current cost. This section shall be updated as the project progress.

Product testing method

Product testing is important in order to ensure the success of the project. Method of testing will involve documentation review, group task review and prototype test.

Documentation review

Each team member will review the draft of the document before the deliverables due date in order to check the accuracy and the quality of the document.

Group Task Review

Weekly reviews will be conducted as a group to ensure each student is progressing well and is working with the group in the right direction.

Prototype Test

The product will be tested to ensure that it meets all the requirements that are stated in the design.

The system will be tested in a modular fashion on the individual sub systems and the whole prototype as a whole system.

Deliverable in each work progress

Deadlines for each section of the project have been set to ensure the completion of the project on time. Table 2 below outlines the main deliverables required for the completion of this project.

Table 2: Project Deliverables

Project Requirements	Covered Topics	Due Date
Project Plan	Statement of work, work breakdown structure, product testing method, deliverables, program management, resources, organisational structure, risk management and needs	Week 7, SP2 2010
Progress Report	Current results of the report (literature reviews and research), update version of the project plan	Week 13, SP5 2010
Deliverables	Logbooks, specification documents (requirements, design and test), system manual, user manual	Week 13, SP5 2010
Seminar	Group speech presentation of the project	1 st Seminar: Week 10 SP2 2010 2 nd Seminar: TBA SP5 2010
Project Web Page	Information related to the project (deliverables, information, team members portfolio etc.) uploaded on the universities project web page	Week 13, SP5 2010
Inspection	Demonstration of the PLC product, poster	Week 13, SP5 2010

Program management

The project will have a designated project manager who will delegate the workload and coordinate management of the project. The project manager will also be the main contact person between the group and the supervisors.

The way in which the group shall coordinate is described below:

- *Regular Group Meetings*
The group shall meet at least once per week with the exception of study breaks and examination periods.

- *Regular Project Meetings*
The group shall meet with project supervisors every two weeks or as requested by the supervisors.

- *Report Procedure*
The group shall make use of Microsoft Office 2007 as the standardised document production means. All documents shall be compiled using this software and one group member will be designated to do the final compilation and editing.

Risk management

Risk management of this project will be approached in an on-going manner. Some anticipated scenarios are outlined below (see Table 4 below). However these are only some of the many unforeseeable scenarios that may influence the completion of the project.

Each of these scenarios will be given a rating based on its likelihood and impact on the completion of the project. These ratings are outlined in the Table 3:

Table 3: Risk Ratings

Likelihood	Low: Very unlikely to happen.	Medium: Quite possible to happen, thus must be prepared to deal with.	High: Anticipated to happen at some point throughout the project.
Impact	Low: Able to manage the risk at the time, due to low impact on the project. No planning required	Medium: The risk will impact the project, but with preparation in advance should have little impact on the overall completion of the project.	High: The impact of the risk is great enough that it will affect the project significantly; planning is required to deal with such a risk.

Table 4: Outlined Project Risks

Risk 1	Short term absence of a team member
Description	A team member is absent due to short term illness, family reasons, work commitments or other unforeseen circumstances
Likelihood	High
Impact	Low
Resolution	In this case the tasks allocated to the absent member shall be divided equally amongst the remaining members until the absent member returns.
Anticipated Completion	For this risk the management will be done throughout the project
Responsible person/s	Michael, Kathleen and James
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Risk 2	Long term absence of a team member
Description	A team member is unable to be present for an extended period of time throughout the project due to: illness, holidays, work commitments, injury or any unforeseen circumstances
Likelihood	Medium
Impact	High
Resolution	Depending on the time away, the work may be divided between the remaining members until the absent member returns. For longer periods of time alteration to the project work load may be required
Anticipated Completion	The management will be done throughout the project.
Responsible person/s	Michael, Kathleen and James

Risk 3	Permanent absence of a team member
Description	For any reason that a member is no longer able to take any part of the project, this may be due to sickness, injury or any other unforeseen circumstances.
Likelihood	Low
Impact	High
Resolution	In the permanent absence of one team, the work will be divided between the remaining two members. If two members are permanently absent, discussion with the project supervisors will be required to determine the continuation of the project and new guidelines. If all members of the group are permanently absent, the project will be cancelled with the possibility of reallocation to a new team.
Anticipated Completion	The management will be done throughout the project
Responsible person/s	Michael, Kathleen and James

Risk 4	Project budget is exceeded
Description	If components required for the project exceed the allowed budget.
Likelihood	Medium
Impact	Medium
Resolution	Lower cost alternatives many need to be considered or discussion with supervisors may be required to obtain extra funds for the required parts.
Anticipated Completion	The management will be done throughout the project
Responsible person/s	Michael, Kathleen and James

Risk 5	Unable to obtain components
Description	Unable to obtain required components within the allocated time frame due to shipping times or availability
Likelihood	Medium
Impact	Medium
Resolution	Alternative components will need to be sourced
Anticipated Completion	The management will be done throughout the project
Responsible person/s	Michael, Kathleen and James

Risk 6	Data and documentation is lost
Description	In the case of hard drive failure, theft or fire.
Likelihood	Medium
Impact	High
Resolution	To prevent the data and documentation being lost, backup files will be stored using a system the university has provided.
Anticipated Completion	The management will be done throughout the project
Responsible person/s	Michael, Kathleen and James

Risk 7	Computer System Failure
Description	Computers malfunction preventing use
Likelihood	Medium
Impact	Low
Resolution	Alternate computers will need to be sourced whilst the primary computers get fixed or replaced
Anticipated Completion	The management will be done throughout the project
Responsible person/s	Michael, Kathleen and James

Resources required

Throughout the duration of this project, a combination of resources will be used to maintain communication with each group member, keep the work to the highest standard and meet the project deliverables on time. The following table (Table 5) are the lists of resources that will be used throughout this project.

Table 5: Lists of Resources

Resources	Comments
<p>Computers x 3: (each member will have their own computer access)</p>	<ul style="list-style-type: none"> - Microsoft Office 2007 <ul style="list-style-type: none"> o Document Preparation o Spreadsheet - Altium Designer <ul style="list-style-type: none"> o Schematic Capture and PCB design - Latex <ul style="list-style-type: none"> o Document Preparation - Solidworks <ul style="list-style-type: none"> o Technical Drawing o 3D modelling - Codevision AVR - Matlab - USB flash drives <ul style="list-style-type: none"> o Data backups - Access to a centralised server <ul style="list-style-type: none"> o File Storage, Backups
<p>Fabrication Equipment</p>	<ul style="list-style-type: none"> - Workbench - PCB manufacturing facilities - Test Equipment <ul style="list-style-type: none"> o Bench Power Supply, Adjustable Voltage and Current Control o Multimeters o Assorted test leads - Tools <ul style="list-style-type: none"> o Pliers o Screwdrivers - Soldering equipment

	<ul style="list-style-type: none">○ Soldering Station○ Solder○ De-soldering braid○ Flux
Mechanical Fabrication Facility	<ul style="list-style-type: none">- Access to mechanical fabrication<ul style="list-style-type: none">○ Construction of demonstration set

Deliverables

Project Plan: Week 7, SP2 2010

This document outlines the scope, resources and schedules of the project

PLC Development: Week 13, SP5 2010

PLC model that meets the required specifications outlined in the specification documents

Log Book: Week 13, SP5 2010

A continual record of each groups individual progress. This book contains information such as ideas, research notes and meeting notes taken during the duration of the project.

Requirement Specification: Week 13, SP5 2010

This document defines the requirements for the project using the standard from of the requirement specification.

Design Specification: Week 13, SP5 2010

Design specification will define the product to be built in a more detailed manner.

Test Specification: Week 13, SP5 2010

This defines the tests performed on the system to ensure that its performance meets with the standards documented in the requirement specifications.

Webpage: Week 13, SP5 2010

A group webpage will be developed detailing relevant information about the project. This will be used during the groups presentation (seminar).

Organisational structure

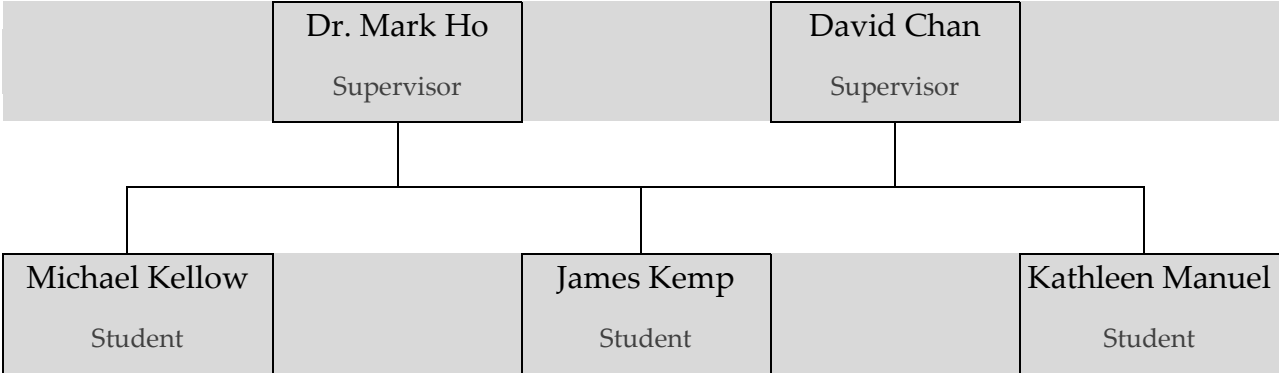


Figure 5: Organisation Structure

Supervisors:

Dr. Mark Ho and David Chan

The supervisor’s role is to oversee the work being performed by the students to ensure the work progresses at an acceptable rate and heads in the desired direction. The supervisors will be approachable in order to provide wisdom and help the students.

Students:

Michael Kellow, James Kemp and Kathleen Manuel

The students will be responsible for the majority of the project from the planning and documentation to the design and implementation. The students will keep the supervisors informed of the projects progress with fortnightly meetings.

Michael Kellow will be responsible for the hardware development. James Kemp will be responsible for the software development. Kathleen Manuel will be responsible for the communication protocol development.

Needs

Currently there are few PLC's available to universities for teaching purposes. The ones that are available are generally too expensive thus, the need for a cheaper alternative to teach industry standard PLC configuration (refer to Table 6)

Table 6: Project Needs

Identifier	Need
N001	The project needs to research existing technologies
N002	The project needs to be cost effective
N003	The project needs to produce a working prototype model
N004	The project needs to meet industry standards
N005	The project needs to be suitable for a teaching environment