CREST
COLLABORATIVE RESEARCH IN ENGINEERING, SCIENCE & TECHNOLOGY

R&D Grant
Guideline on
Developing Project Plan

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About Research Project Plan

- CREST favors well-thought off research plan while recognizing the realism of progressive elaboration in the development of any typical project

- Properly documented research project plan provides indication to CREST how research project will be carried out

- This document guides research project plan to address primary CREST concerns only
  - Scope description
  - Schedule
  - Cost plan
  - Resource plan
  - Risk plan

- This document does not outline standard

Research Project Scope

- Research project scope should be defined with greater specificity
- Research project should be decomposable into several subcomponents and indicated accordingly in the research project plan
  - By objectives: according to research objectives
  - By parts: according to different units of research
  - By phases: according to logical research sequence
  - Combination of the above
- Research project plan should cover project scope as well as research scope

Project Scope and Research Scope

- Research scope and project scope should be well integrated to ensure desired outcome can be achieved

Project Scope	Research Scope
Describes work needed to carry out the research. E.g. hiring of researchers, buying equipment.	Describes the objectives, findings, analysis and results of the research. E.g. experimenting ABC.
Results in completion of the research and deliverables.	May include subsidiary research components.
Deliverables include student graduation, journal paper, IP submission, etc.	Results include theories, prototype, model, etc.
Completion quality is measured against project plan.	Completion quality is measured against research objectives.

Research Project Schedule

- Schedule can be communicated in tabular or graphical form
- Complete schedule includes information on assumptions and constraints considered
- Consider using tools and techniques that aids development of good schedule
  - Critical path method
  - Critical chain method
  - What-if scenario analysis
- Schedule should indicate tasks or activities, milestones, owners, sequence, dependencies, date and duration

Schedule Definition and Terminologies

Subcomponents	Research is broken down into distinct objectives, parts, phases, etc.
Tasks/activities	Each subcomponent is broken down into list of meaningful activities or tasks
Sequenced Activities	Activities are sequenced based on known dependencies and constraints
Milestones	Events that signify important direction are marked so that they receives special attention
Activity owner	Activities or tasks have assigned owner indicating types and quantities of resources
Durations	Valid estimates for the time needed to perform each activity or task are stated
Overall Schedule	Synthesized of individual tasks, durations and dependencies into a holistic view of the research

Example of Inadequate Schedule
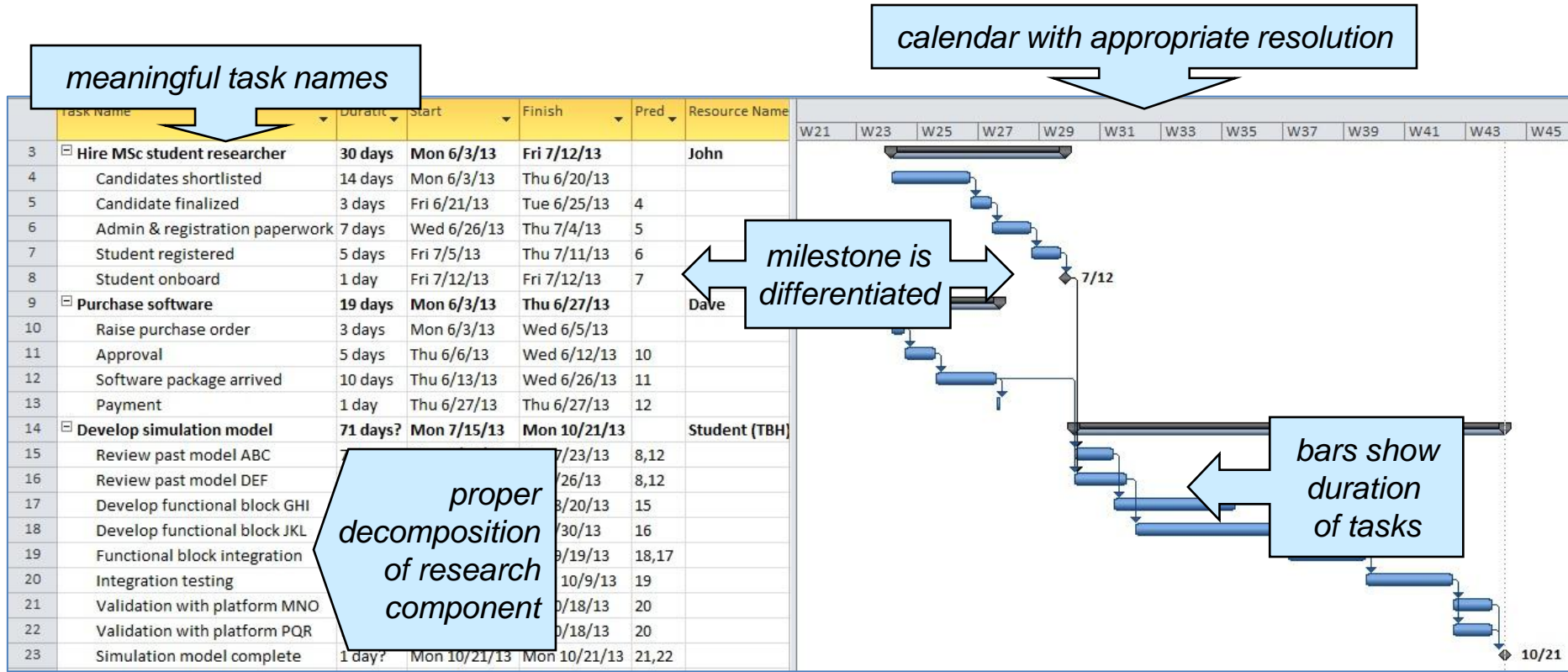

inappropriate timeline resolution

Task Name	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Hire MSc student researcher									
Candidates identified	■								
Administration and registration paperwork		■							
Student registered		■							
Purchase software									
Raise purchase order	■								
Software package arrived		■							
Develop simulation model									
Team meeting			■						
Trial and error			■						
Develop necessary functional blocks				■	■	■			
Testing #1							■		
Testing #2							■		
Validation with platform MNO								■	
Validation with platform PQR								■	
Similation model complete									■

important milestone not indicated

task names are not meaningful

start date, dependency and task owner are missing

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Example of Better Schedule

meaningful task names

calendar with appropriate resolution

milestone is differentiated

proper decomposition of research component

bars show duration of tasks

	Task Name	Duration	Start	Finish	Pred	Resource Name
3	⊟ Hire MSc student researcher	30 days	Mon 6/3/13	Fri 7/12/13		John
4	Candidates shortlisted	14 days	Mon 6/3/13	Thu 6/20/13		
5	Candidate finalized	3 days	Fri 6/21/13	Tue 6/25/13	4	
6	Admin & registration paperwork	7 days	Wed 6/26/13	Thu 7/4/13	5	
7	Student registered	5 days	Fri 7/5/13	Thu 7/11/13	6	
8	Student onboard	1 day	Fri 7/12/13	Fri 7/12/13	7	
9	⊟ Purchase software	19 days	Mon 6/3/13	Thu 6/27/13		Dave
10	Raise purchase order	3 days	Mon 6/3/13	Wed 6/5/13		
11	Approval	5 days	Thu 6/6/13	Wed 6/12/13	10	
12	Software package arrived	10 days	Thu 6/13/13	Wed 6/26/13	11	
13	Payment	1 day	Thu 6/27/13	Thu 6/27/13	12	
14	⊟ Develop simulation model	71 days?	Mon 7/15/13	Mon 10/21/13		Student (TBH)
15	Review past model ABC			7/23/13	8,12	
16	Review past model DEF			/26/13	8,12	
17	Develop functional block GHI			8/20/13	15	
18	Develop functional block JKL			/30/13	16	
19	Functional block integration			9/19/13	18,17	
20	Integration testing			10/9/13	19	
21	Validation with platform MNO			0/18/13	20	
22	Validation with platform PQR			0/18/13	20	
23	Simulation model complete	1 day?	Mon 10/21/13	Mon 10/21/13	21,22	

7/12

10/21

Research Project Cost Plan

- Thorough cost plan should be comprehended during research project planning
  - Activities eligible for CREST funding should be included in CREST R&D Grant application
  - Activities not eligible for CREST funding should have plan for other funding source
  - Certain cost elements i.e. industry contribution, should be declared in CREST R&D Grant application although not eligible for funding
- Good cost estimates can be obtained from
  - Activity/task cost estimates
  - Resources to perform tasks
  - Expected contract, equipment, material
- Basis of estimates and assumptions should be clearly noted

Cost Definition and Terminologies

Cost Plan	Overall cost plan for the research project encompassing both non-eligible and eligible CREST funding items.
Requested budget	Eligible but unapproved amount requested during CREST R&D Grant application, or unapproved change amount requested throughout the project.
Plan of record budget	Amount for the whole research project or for each expense category which were approved during grant application review. The plan of record budget shall reflect the updated budget after change request is approved.
Expense category	(1) Allowance and emoluments, (2) other personal cost, (3) rental, (4) procurement of equipment, (5) procurement of software, (6) procurement of research material, (7) maintenance and report, (8) miscellaneous.

Research Project Resource Plan

- Research project plan should address
  - Research team composition
  - Roles and areas of responsibilities, e.g.
    - Project leader
    - Principal investigator
    - Researchers
    - Advisors
    - Stakeholders

    Same person may hold multiple roles
  - Hiring plan: how and when they will be acquired if they are not on board
  - Training plan: what training is needed and how it will be fulfilled
  - Compliance: organizational and regulatory requirement considerations

Research Project Risk Plan

- Research project plan should state identified risks and response plan
- Risk information needs to be accurate and unbiased to be credible
- Risks should be ranked and categorized according to its probability of occurrence and impact
- Grouping risks by categories can lead to developing effective risk responses. Categories can be by
  - Sources of risk
  - Rating of risk
  - Type of risk
- Risk response strategies can be to
  - Exploit, enhance, accept
  - Avoid, transfer, accept, mitigate, minimize
- Risk plan used in CREST R&D Grant applicant should be in line with risk plan used during project monitoring

Risk Definition and Terminologies

Risk	Uncertain event or condition that if occurs or develops has impact on at least one objective. May have one or more causes and if materializes one or more consequences.
Risk condition	Related to the environment which the research project is run and risk event occurs.
Risk event	The occurrence of the risk.
Uncertainty	State characterized by absence of information related to an outcome.
Risk categories	Example: (a) technical, external, organization, project management. (b) high, medium, low. (c) schedule, cost, resources, scope
Risk impact	Show stopper, high, medium, low
Risk response	Action to be taken in response to the identification of the risk. Response can be performed before of after risk event.

Risk Plan

- Example of risk plan that should be included in the application

Rank	Risk Statement	Risk code	Risk response
1	Stability of software ABC for simulation work	1	Avoid: Pull in development of software ABC 4 weeks earlier and include software regression test
2	Inbility to hire PhD student researcher before Q4'13	2	Mitigate: Hire MSc student currently studying in school
3	Fluctuation in currency exchange causing RM10k above budget	3	Accept: justify need for additional fund from school

- Should include both technical and operational

Risk Code Definition

Probability	Low	Medium	High	Showstopper
100%	Realized	Realized	Realized	Realized
75-99%	3	2	1	1
50-74%	3	3	2	1
25-49%	4	3	3	2
0-24%	4	4	3	3

Impact

Risk Statement

- Decent risk statement
  - If the team does not have stable software code, then the experiment work slips

- Clearer risk statement
  - If the team does not have stable XYZ software code at ABC lab 4 weeks before experiment work starts, then the experiment work slips

- Better risk statement
  - If the Unit 1 research team does not have stable XYZ software code at ABC lab 4 weeks before DEF experiment work starts, then the completion of the DEF experiment work slips 5 weeks impacting Unit 2 of the research.