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# HOW TO CONDUCT MASTER PROJECT

Dr. Nor Azwadi bin Che Sidik  
Head of Postgraduate Studies  
Faculty of Mechanical Engineering  
Universiti Teknologi Malaysia



## **Master of Engineering (Taught course)**

10 credits (25%) – Mech.

7 credits (17%) – Adv. Man. Fact.

7 credits (17%) – Marine Tech.

10 credits (25%) – Materials Eng.

7 credits (17%) – Industrial Eng.





## **RULES and REGULATION**

### **Master of Engineering (Taught course)**

Before registering for Master project I, you must  
complete at least 3 faculty courses  
complete Research Methodology or take concurrently.

You must take Master Project I and II in two different semester (but not necessary in two continuous semester)



## RESEARCH TOPICS

### Master of Engineering

#### Research title

- 1) *Student propose own research title*
  - Decide research interest
  - See Program's Coordinator or Head of Postgraduate Studies to decide suitable supervisor
  - Discuss with supervisor to decide title, objective and scope
  - Download the form from FKM postgraduate website
  - Fill up the form and submit to postgraduate office



## RESEARCH TOPICS

### Master of Engineering

#### Research title

- 1) *Select the title from the list*
  - Get the list from FKM' postgraduate website or notice board
  - Get the topic selection form from postgraduate office
  - Fill up the form and get the supervisor's signature
  - Submit the form to postgraduate office
  - (Form must be submitted to postgraduate office before end of registration period)



## **EVALUATION METHOD**

### **Master of Engineering (Taught course)**

***Seminar – 25% (Panel of Examiners)***

Problem identification – 20%

Literature Review – 30%

Research Methodology – 30%

Response to question – 10%

Overall presentation – 10%



## **EVALUATION METHOD**

### **Master of Engineering (Taught course)**

#### ***Draft Evaluation – 20% (Supervisor)***

Problem identification – 2%

Appropriateness of literature survey – 6%

Proposed research methodology – 4%

Organization - Clearly identified purpose & approach, content organization, topic transition, appropriate introduction and conclusion – 4%

Presentation - Easy to read, grammatically correct, uniformity of writing style – 2%

Layout/Visual - Graphics, quality, uniformity of document design and layout – 2%



## **EVALUATION METHOD**

### **Master of Engineering (Taught course)**

***Implementation – 55% (Supervisor)***

Log book and attendance – 10%

Student's attitude and interest – 10%

Literature awareness – 15%

Work planning and execution – 20%

Effort, independency and critical thinking – 20%

Problem identification and proposed solution method –  
20%

Overall capabilities - 5%





## **EVALUATION METHOD**

### **Master of Engineering (Taught course)**

***Seminar – 20% (Panel of examiners)***

Overall presentation – 15%

Engineering and Technical Content – 30%

Results analysis and discussion – 35%

Response to question – 20%



## **EVALUATION METHOD**

### **Master of Engineering (Taught course)**

#### ***Draft – 40% (Supervisor)***

Topic Mastery – 4%

Appropriate level of detail – 4%

All requested deliverables included – 8%

Completeness of analysis & Data Interpretation – 12%

Organization of draft – 4%

Presentation - easy to read, grammatically correct,  
uniformity of writing style – 4%

Layout/Visual - Graphics, quality, uniformity of document  
design and layout – 4%



## **EVALUATION METHOD**

### **Master of Engineering (Taught course)**

#### ***Implementation – 35% (Supervisor)***

Log book and attendance – 5%

Student's attitude and interest – 10%

Work planning and execution – 10%

Data Collection – 15%

Effort, independency and critical thinking – 20%

Analysis and discussion – 20%

Overall capabilities - 20%



## **Project Paper = 5%**

Students are requested to submit a summarized of research written in journal format

<http://www.fkm.utm.my>

Submit the project paper (soft copy burnt in CD) to the postgraduate office 3 days before seminar



## HOW TO DO RESEARCH (Master Project I)

### Week 1

Buy log book from postgraduate office (RM3.00)

First meeting with supervisor

Plan your research – draw flow chart and Gantt chart

Items	2010												2011												2012				
	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5					
1. Literature review of two-phase with Navier-Stokes	█	█	█	█	█	█																							
2. Literature review of two-phase flow with mesoscale method				█	█	█	█																						
3. Literature review of characteristics of nasal flow and propagation of cloud particles											●																		
4. Development of Langragian-Langragian mesoscale numerical method											█	█	█	█	█														
5. Simulation of nasal flow and propagation of cloud particles															█	█	█	█	█	█									
6. Validation results and report writing																							█						

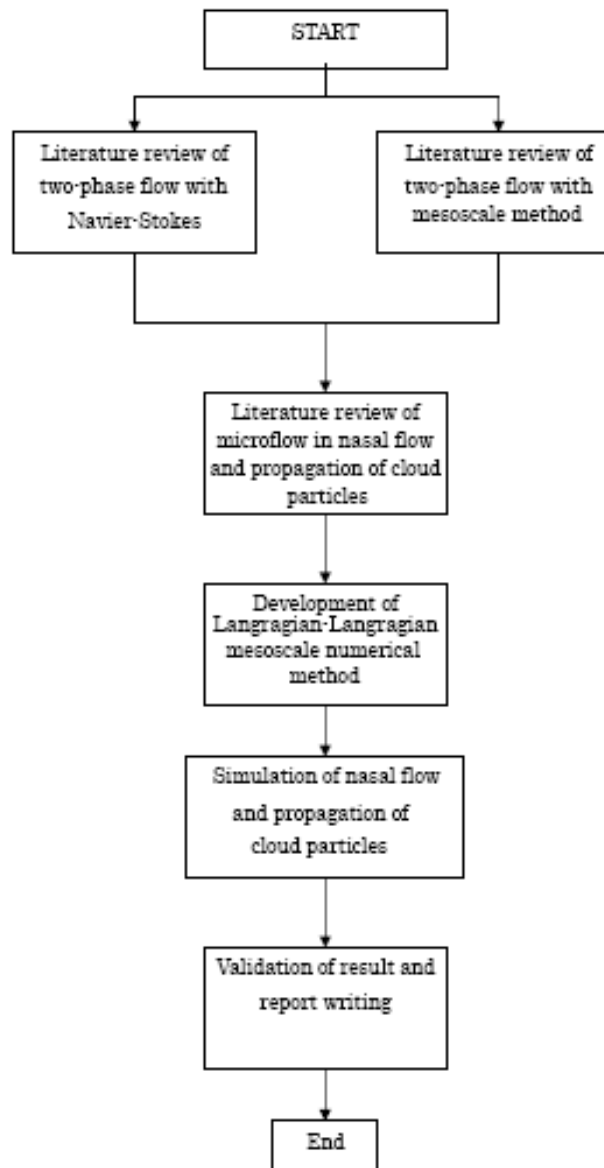
Milestone ●

31 March 2011 - Literature review on two-phase flow with Navier-stokes and mesoscale is completed

31 July 2011 - Langragian-Langragian based mesoscale numerical method is developed

31 May 2012 - Results for the behaviour of solid particles in nasal flow and propagation of cloud particles are obtained.

Papers submitted to conferences and journals





## HOW TO DO RESEARCH

### Week 2 to 7

Second meeting with supervisor

Discuss results from literature study

Reference 1:

Title: *Numerical study of ....*

Journal: *Journal of Applied Science*

Volume: *3 Issue 1*

Page: *1-16*

Author: *Nor Azwadi C. S. and Tanahashi, T*

*Investigate numerically using lattice Boltzmann double population method of the phenomenon of fluid flow in microchannel. Range of Knudsen number is 0.01 to 0.1. Reynolds number equals to 500.*

*Validation of results with experiment.*



## HOW TO DO RESEARCH

### Week 2-7

Reference 2:

Title: ....

Journal:

Volume:

Page:

Author:

Summary:

Number of reference: between 30 to 50 references

Start writing thesis: Chapter One (introduction)





## HOW TO DO RESEARCH

### Week 8

Eighth meeting with supervisor

Select main reference papers

Conclusion from literature review study

Define problem statement:

*Method has never been applied to study.....*

*(add the significant of the study)*

*All the available methods are not accurate, inefficient....*

*Not well understood about certain phenomena*

Define significant of your research

Redefine the scope of your research

Write thesis Chapter Two : Literature Review



## HOW TO DO RESEARCH

### Week 9-11

Research methodology

Study current numerical formulation, experimental method, analytical theory, etc (from main reference)

What is your new contribution.

(Accuracy, efficiency, improvements, relevant to current demand, etc)

Write thesis Chapter Three: Research Methodology



## HOW TO DO RESEARCH

### Week 12-14

Obtain preliminary results

simple numerical test using proposed method

Redo the numerical test using current method

Simple experiments

.....

Write thesis Chapter Four: Results and Discussion



## HOW TO DO RESEARCH

### Week 15

Submit draft to your supervisor

Preparation for Seminar

Prepare handout (powerpoint presentation) to be distributed to the examiners



## Master Project II

First week

Draw Gantt chart

Second week-14<sup>th</sup> week

Continue research

Write thesis (refer Thesis Manual)





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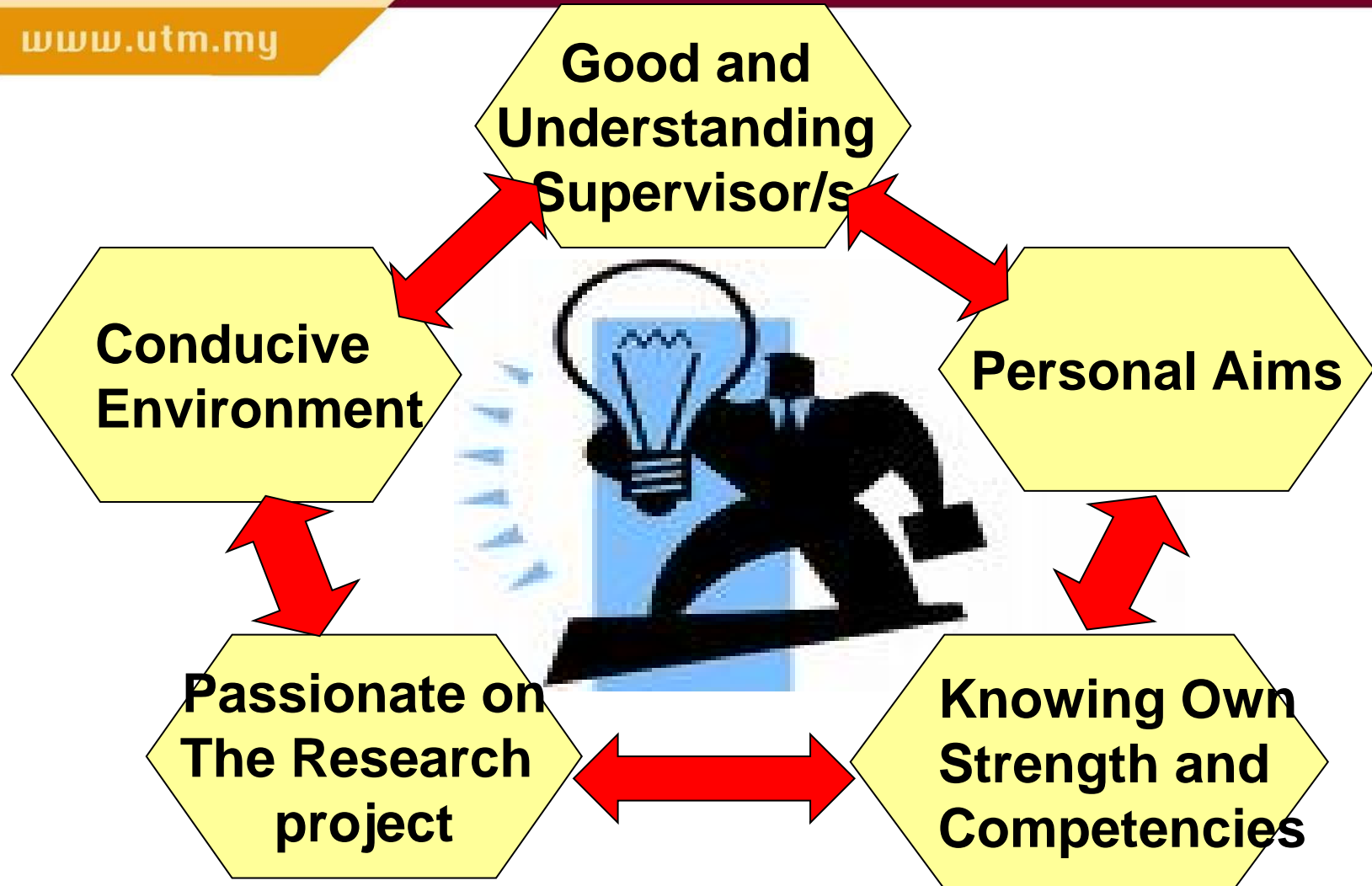
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# How to become a good post graduate student





## The Critical Success Factors





## Set Personal Objectives

- 1. Identify what is stopping you from achieving your goal or things that concern you**
- 2. Identify what will help you achieve your goal**
- 3. Identify the resources which might help you**
- 4. Now set some deadlines**







## Characteristics of Outstanding Students

### Work habit

Uses time efficiently and is willing to work extra hours.  
Performed to the highest standards.  
Proactively initiates experiments.

### Journal reading

Actively and continuously performs literature searches to independently locate journal articles.

### Research hypotheses

Independent and continuously formulates hypotheses for both student's own project and other related project.

### Writing

Continually writes, including maintaining updated literature review of pertinent topics, writing journal publications and reports

## Characteristics of Mediocre Students

### Work habit

Has a rigid view of research as a "9 to 5" job.  
Takes shortcuts on laboratory experiments. Only performs experiments told by supervisor.

### Journal reading

Reads only journal articles provided by advisor or other students.

### Research hypotheses

Content to work on research hypotheses developed by research advisor or others.

### Writing

Only write when forced by supervisor



## Characteristics of Outstanding Students

### **Publication**

Realizes that publication of research results is paramount, and focuses considerable effort in developing and writing manuscripts. Continuously develops new publication ideas and proactively approaches supervisor with potential manuscripts.

### **Problem solving**

Looks at research problems as an opportunity to grow and learn. Develops potential solutions to problems and discusses them with supervisor.

### **Teamwork**

Understands that the collective output of the laboratory is a key component of the student's own success, and therefore willingly assists others in the lab.

## Characteristics of Mediocre Students

### **Publication**

Looks at publication as an afterthought to the experiments. Minor effort put forth in developing manuscripts and assumes advisor will rework mediocre manuscript

### **Problem solving**

Comes to supervisor seeking solutions to research problem

### **Teamwork**

Focuses solely on their own research



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## Managing Relationship with Your Supervisor

This relationship **can be the most rewarding** and **most frustrating** aspect and it is likely that you will experience both aspects at some time.

It is not uncommon for misunderstandings to arise between student and supervisor during the postgraduate studies.

Always remember that your supervisor shares an important goal with you – the successful completion of your degree.

In this area they will almost certainly have your best interests at heart. It is up to you to discover the specifics of what your supervisor expects from you, but in general terms you should:

<b>The Important Aspects</b>	<b>Tips for Solution</b>
<b>Be Independent</b>	Do not use your supervisor to set your objectives; produce project plans, analyze your findings, or as a spell checker for your thesis!
<b>Arrange formal supervisory meetings</b>	Remember that your project is only one of many constraints on your supervisor's time
<b>Plan for meetings</b>	It might be useful for your supervisor to know what you want to discuss, so don't be afraid to send information in advance.
<b>Be honest</b>	The study is a period of <b>TRAINING</b> . You are not expected to get everything right first time and talking through your mistakes will give you the benefit of other people's experience. Although it may be uncomfortable, you will ultimately gain the respect of your supervisor.
<b>Keep a sense of perspective</b>	As a trainee researcher you must expect to receive feedback and criticism. The purpose of this is to improve your performance: you should try not to take personally.
<b>Follow your supervisor's advice</b>	Challenge their suggestions with your own if you feel you have a better solution, but never ignore advice. They've been doing this a lot longer than you have!
<b>Don't wait to be told</b>	Am I doing enough research? Are these results credible? Am I planning my work effectively? Am I using the literature appropriately?
<b>Show that you are enjoying research</b>	Your research is also part of your supervisor's research portfolio. This is their passion and they can feel insulted when their students aren't enthusiastic about their work.
<b>Meet deadlines</b>	Particularly those set by your supervisor.



## Common Problems

### The Common Problems

### Possible Solution Strategies

**Laziness/lack of motivation**

Set short term task; Get someone to help;  
Identify what motivates you;  
Give yourself regular rewards

**Lack of self confidence**

Try to stretch yourself; Try new things;  
Don't undersell yourself

**Poor time management**

Look at your time stealers and see how they can be reduced;  
Set realistic aims;  
Allow time for reflection

**No focus or direction**

Start by increasing your self awareness; Try lots of different experiences and eliminate the ones you dislike;  
Keep open minded

**Limited support**

Build your own support network; Get a mentor;  
Try and work in teams;  
Improve your relationship with your supervisor



## The Common Problems

## Possible Solution Strategies

### **Comfort zone**

Recognize your comfort zone;  
Try continually to stretch yourself;  
volunteer for presentations;  
Take on new responsibilities.

### **Fear of failure/taking risks**

Learn more from your failures than successes;  
Don't take it Personally;  
Remember that you are TRAINING to be a researcher.

### **Lack of relevant experiences**

Identify where your gaps are;  
Creatively explore all options;  
seize opportunities - Maximize your impact as a PhD/MSc student.



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Thank you