

Health and Safety Risk Assessment for Experiment, Project and Off-Campus Activities

The objective of risk assessment is to perform a careful examination of what could cause harm to people (hazards / risks). When properly performed, it helps ascertain whether the effectiveness and adequacy of the precautions already in place, or whether more has to be done. Staff and students should assess their new experiments, projects and off-campus activities critically and fill in the form completely.

Risk assessment should also be performed:

- for those existing experiments, projects and off-campus activities which have not been assessed before;
- as soon as change occurs;
- after an incident/accident; and
- regularly for not less than once in a year.

➤ Please submit the completed form to Principal Investigator, Head of department ~~or Dean of School/College~~ for his / her review, approval, recordkeeping and monitoring.

➤ The approved form should be copied to the student / staff involved for them to observe the control measures and put them in place.

Reference: 1) Risk Management; 2) Five steps to risk assessment

Part I - Particulars * Please expand boxes and add lines as required.

College/School: College of Engineering (CENG)		Department: MSE	
1. Person(s) Responsible for This Work (Principal Investigator): (i.e. Your supervisor/Course leader)			
Name:		Position:	
2. Person Carrying Out The Risk Assessment:			
Name:		Position:	
Proposed start date of this work:			
Date risk assessment undertaken:			
3. Other Student/Staff Involved: (e.g. Your Tutors/senior staffs/students under the same project)			
Name	Position	College/School	Department
4. Location of Activities: (Please refer to "CAUTION" posted on the lab door)			
Location	Activities	Location-In-charge (Contact Number)	
5. Off-Campus Activities: Usually not applicable for FYP students			
Verified with Finance Office (FO) and/or the insurance broker about the insurance coverage for the activity?			Yes / No

6. Animal involved: Usually not applicable for FYP students	
Yes / No <i>(If Yes, please provide relevant documents in (a) and (b))</i>	
a. Obtained animal research ethics approval	Yes / No
b. Obtained animal research licence	Yes / No
7. Experiment/ Project/ Off-Campus Activities Title: (i.e. your FYP project/research project)	
8. Summary / Abstract of experiment, project or off-campus activities: <i>(Please provide a simple description of the work)</i> (i.e. your FYP project/research project)	
8.1 Overview of the work	
8.2 Procedure of the work	
9. Legal Requirement:	
9.1 Specify and Legal Requirements/ Code of Practice from the Government (if any): For example: 1) Boiler & Pressure Vessels (Cap. 56); Lifting Appliance (LA) and Lifting Gear (LG) (Cap. 59J); Importation of Hazardous Materials or Equipment (Cap. 60 & Cap. 599); Hazardous Waste Disposal (Cap. 354); Animal Work Safety (Cap. 340); Radiation Safety (Cap. 303)	

Part II (Risk Assessment)

Please break down the Experiment / Project / Off-Campus Activity into steps at the table below. Then by referring to **Appendix 1: Risk Assessment Guidance Notes**, identify as many as possible the potential hazards that could be created for each of the steps and write down the corresponding hazard code for each step. If there is more than one hazard, please create a new entry.

Hazard Code [@]	Operation/Process Involved	Existing Risk Rating			Control Measures ⁺	Residual Risk Rating		
		H [#]	L [*]	R [^] = H x L		H [#]	L [*]	R [^] = H x L

Remark:

[@] Refer to Appendix 1, Section 1 Checklist of Potential Hazards and Corresponding Hazard Code

[#] Refer to Appendix 1, Section 2 Risk Rating – Table 2: Description of Hazard Severity

^{*} Refer to Appendix 1, Section 2 Risk Rating – Table 3: Measures of Likelihood

[^] Refer to Appendix 1, Section 2 Risk Rating – Table 1: Risk Matrix

⁺ Refer to Appendix 1, Section 3 Control Measures

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Part III (Substances used)

Please list out chemicals, biological substances, animals to be used

Item Description <i>(e.g. Name, CAS No., species, serotype)</i>	Concentration/ Amount/Quantity	Controlled under Ordinance (Y/N)

If chemicals are to be used in the experiment, have you read their MSDS and understood the potential hazard and associated precaution measures and safe handling procedures? **(Yes /No)**

Part IV (Declaration section)

I hereby declare that the information provided above is to my best knowledge true, correct and complete.

Person Carrying Out The Risk Assessment		Endorsed & Reviewed by PI/HoD/Dean (i.e. Your supervisor)	
Signature		Signature	
Name		Name	
Date		Date	

IMPORTANT: Please retain and keep proper records. The approved form should be copied to the student / staff involved for them to observe the control measures and put them in place. Please submit a **signed form** with training record to MSE office by **online submission system for recordkeeping**.



Appendix 1: Risk Assessment Guidance Notes

1. Checklist of Potential Hazards and Corresponding Hazard Code

	<u>Hazard</u>	<u>Hazard code</u>
*	Bodily burnt due to	
	<ul style="list-style-type: none"> high temperatures (handling hot metal, high temperature operations, casting, etc.) 	B1
	<ul style="list-style-type: none"> cold temperatures (handling cryogenic fluids, working in freezing conditions, etc.) 	B2
*	Bodily injury resulting from mechanical energy	
	<ul style="list-style-type: none"> Cut by rotating shaft, mandrel 	B3
	<ul style="list-style-type: none"> Cut by rotating cutters, (machine tools) 	B4
	<ul style="list-style-type: none"> Cut by reciprocating die and tools, 	B5
	<ul style="list-style-type: none"> Cut by in-running nips of gear, bearing, etc, 	B6
	<ul style="list-style-type: none"> Hurt by moving object (e.g., robot arm) 	B7
	<ul style="list-style-type: none"> others 	B8
*	Biohazard	
	<ul style="list-style-type: none"> animals 	B9
	<ul style="list-style-type: none"> microorganisms 	B10
	<ul style="list-style-type: none"> bacteria 	B11
	<ul style="list-style-type: none"> viruses 	B12
	<ul style="list-style-type: none"> human clinical specimens 	B13
	<ul style="list-style-type: none"> fungi 	B14
	<ul style="list-style-type: none"> parasites 	B15
	<ul style="list-style-type: none"> others (such as organ, tissue or cell culture) 	B16
*	Chemical Hazard	
	<ul style="list-style-type: none"> flammables (such as acetone, methane, hydrogen) 	C1
	<ul style="list-style-type: none"> toxic (such as chloroform, ammonia, cyanides) 	C2
	<ul style="list-style-type: none"> corrosives (such as hydrofluoric acid) 	C3
	<ul style="list-style-type: none"> peroxide forming chemicals (e.g. diethyl ether, tetrahydrofuran, 1,4-dioxane) 	C4
	<ul style="list-style-type: none"> explosives (e.g. picric acid, perchloric acid, azides and perchlorate of heavy metals) 	C5
	<ul style="list-style-type: none"> compressed gas 	C6
	<ul style="list-style-type: none"> antibiotics, drugs, poisons 	C7
	<ul style="list-style-type: none"> highly reactive chemicals (e.g. Pyrophorics, Self-heating / self-reactive substances, Substances which, in contact with water, emit flammable gases) 	C8
	<ul style="list-style-type: none"> nanomaterials 	C9
*	Confined space hazard	C10
*	Electric shock due to	
	<ul style="list-style-type: none"> contact with exposed live component 	E1
	<ul style="list-style-type: none"> use of high power/voltage source 	E2
	<ul style="list-style-type: none"> design of own power source 	E3
	<ul style="list-style-type: none"> others 	E4
*	Fire Hazard (e.g. use of flammables, open flame, overloading, short circuiting, etc)	F1
*	Fall of person from height	F2
*	Flying Objects	F3
*	Hand tools	H1
*	Heat Stress	H2
*	Hit by falling object	H3

<u>Hazard</u>		<u>Hazard code</u>
*	Machinery	M1
*	Manual Handling	M2
*	Motor Vehicle	M3
*	Noise (≥85 dB(A))	N1
*	Off Campus Activities	
	• handling of animals	O1
	• insects/ticks/other biting organisms	O2
	• illness or allergic reaction	O3
	• dehydration	O4
	• heatstroke	O5
	• toxic substances	O6
	• others (e.g. temperature extremes, altitude)	O7
*	Others (please specify)	Others
*	Plant and Equipment	P1
*	Portable Electrical Tools	P2
*	Pressure Hazard	P3
*	Radiation	
	- Non-ionizing radiation	
	• ultraviolet (e.g. UV lamp)	R1
	• laser	R2
	• very high radio frequency (>1G)	R3
	• far infra-red (> 1um)	R4
	• magnetic field (e.g. NMR, MRI)	R5
	• others	R6
	- Ionizing radiation	
	• alpha particles	R7
	• beta rays	R8
	• gamma and X rays	R9
	• machine producing ionizing radiation	R10
	• others	R11
*	Sharp objects (e.g. needle)	S1
*	Welding	W1

(If you cannot find suitable hazard category from the above table, please put down "Others" in your form.)

2. Risk Rating (R)

The Risk Rating is determined using the Risk Matrix below:

Table 1: Risk Matrix

LIKELIHOOD (How likely could it happen?)	CONSEQUENCES (How severely could it hurt someone?)			
	Minor (1)	Moderate (2)	Major (3)	Catastrophic (4)
Rare (1)	L	M	H	H
Unlikely (2)	L	M	H	E
Likely (3)	H	H	E	E
Almost certain (4)	H	E	E	E

Legends: E = Extreme risk H = High risk M = Moderate risk L = Low risk

Evaluate the level of risk for each of the above hazards using the formula below as a guide:

Risk Rating (R) = hazard severity (H) x likelihood of the hazard arising (L)

(where severity and likelihood can be estimated and quantified by using the Table 2 and Table 3 below respectively)

Table 2: Description of Hazard Severity (H)

Severity	Description
Minor (1)	First aid treatment only, no lost work time
Moderate (2)	Casualty treatment
Major (3)	Serious bodily injury
Catastrophic (4)	Death, permanent disablement

Table 3: Measures of Likelihood (L)

Likelihood Scale	Description
Rare (1)	Could occur but probably never will
Unlikely (2)	Could occur but rare
Likely (3)	Could occur occasionally
Almost certain (4)	Could occur often

3. Control measures

All hazards must be addressed using the hierarchy of control measures in the following order of priority: elimination, substitution, isolation, engineering, administrative, personal protective equipment (PPE).

1 st :	<u>Eliminating / substituting</u> the hazard giving rise to the risk with a hazard giving risk to a lesser risk, such as use of a safer machine, chemical
2 nd :	<u>Isolating</u> the risk by keeping the operator away from the hazard, such as provision of fixed guard, fume cupboard
3 rd :	Minimizing the risk by <u>engineering means</u> (redesign), such as provision of lifting equipment to reduce manual handling
4 th :	Applying <u>administrative measures</u> , such as limiting the exposure time
5 th :	Using adequate <u>personal protective equipment (PPE)</u> .