NOTES OF GUIDANCE GROUP PROJECT CHE332

UNIVERSITI TEKNOLOGI MARA

INTRODUCTION TO ENVIRONMENTAL ENGINEERING (CHE332)
GROUP PROJECT (40%)

ETAC 2020: (CO4, PO7, A4)

ETAC 2024: (CO4, PO6, A3)

ETAC 2024: (CO4, PO6, C3)

Introduction

Programme Outcome (**ETAC 2020 PO7**):

- Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts.

Programme Outcome (**ETAC 2024 PO6**):

- Evaluate (C5) solutions while demonstrating (A3) responsibility in solving well-defined chemical engineering problems in line with the needs of sustainable development to society, the economy, sustainability, health and safety, legal frameworks, and the environment (DK1, DK5, and DK7)

At the end of this assignment, the students should be able to:

- Organize a community event to raise awareness on pollution control and environmental sustainability.
- Understands and participates in developing, and/or sustaining a positive change in the communities.
- Understands the role of society and society issues in shaping values.
- Contributes effectively to the achievement of a group's goals, objectives, and shared vision.
- Works positively and cooperatively with others.

Course And Programme Outcomes with Well-defined Problems Solving & Knowledge Profile

This assignment addresses one (1) course outcome and one (1) programme outcome (PO) which are mapped to well defined engineering problem (DP) and the required knowledge profiles (DK) as shown in Table 1.

1.0 Course Outcomes (CO), Programme Outcomes (PO) and Well-Defined Problems (DP) & Knowledge Profiles (DK)

<table>
<tr><th>Course Outcomes</th><th>Programme Outcomes</th><th>Well-Defined Problem Characteristics/ Taxonomy level</th></tr>
<tr>
<td rowspan="2">Demonstrate (A3) community engagement by solving environmental engineering problems, and evaluate (C5) the impact of sustainable development on environmental systems, society, the economy, health, safety, and legal frameworks.</td>
<td>ETAC 2020 PO7:
Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts. (DK7)</td>
<td rowspan="2">DP1- in-depth of knowledge required.

DP1 cannot be resolved without extensive practical knowledge as reflected in DK6 and DK7 supported by theoretical knowledge defined in DK3 and DK4

Required DKs are:

DK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline

DK4: Engineering specialist knowledge

DK6: Practical engineering knowledge

DK7: Knowledge of Issues and Approaches

DP2 – Range of conflicting requirements:
involve several issues, but with few of these exerting conflicting constraints

DP3 – Depth analysis required:

DP4: Familiarity of issues: are frequently encountered and thus familiar to most practitioners in the practice area.

DP6 – Extent of stakeholder involvement & conflicting requirements
involve a limited range of stakeholders with differing needs</td>
</tr>
<tr>
<td>ETAC 2024 PO6:
Evaluate (C5) solutions while demonstrating (A3) responsibility in solving well-defined chemical engineering problems in line with the needs of sustainable development to society, the economy, sustainability, health and safety, legal frameworks, and the environment (DK1, DK5, and DK7)</td>
</tr>
</table>

2.0 Learning Outcome (LO)

At the end of the group project, the students should be able to:
LO1: Organize a community event to raise awareness on pollution control and environmental sustainability (CO5-PO6).
LO2: Understands and participates in developing, and/or sustaining a positive change in the communities (CO5-PO6).
LO3: Understands the role of society and society issues in shaping values (CO6-PO6).
LO4: Contributes effectively to the achievement of a group's goals, objectives, and shared vision.
LO5: Works positively and cooperatively with others.

3.0 Specific Tasks

In this day and age, destruction towards the environment have become a major concern across the globe which requires urgent attention. Therefore, as a group, you are required to organize an environmental awareness program to educate the communities on the necessity and responsibility in environmental sustainability

In addition to the importance of Sustainable Development Goals (SDGs) with the needs of today's community, it is encouraged for the students to contribute for making progress, planning, ideas and execution by applying the SDG initiatives.

Sustainable Development Goals by United Nations

The specific tasks are to be carried out are shown in below

	No	Task	Notes
Proposal Presentation (Week 3) Each class will be given a title for the community program that relates to either waste management, pollution control (water, air or soil) or any relevant environmental awareness activities that falls within the CHE332 syllabus. Each group is required to orally present the proposal to the lecturers. The best proposal will be selected to be implemented in the real community program by the whole class.			
PROPOSAL PRESENTATION	**1**	To brainstorm and identify the specific content or problem that relevant with the given title faced by the chosen community, within the environment and sustainability contexts, and relevant to engineering practices.	CO5-PO6 DP1: Depth of Knowledge (DK3, DK4, DK6 & DK7) DP4: Unfamiliarity Issues
	2	Discuss what the community do and how they interact with their environment that contributes to the problem and come out with innovative suggestions to solve the issues that best suited to the chosen community and environment sustainability.	CO5-PO6 DK7: Knowledge of Issues and Approaches DP2: Conflicting requirements DP3: Depth of analysis
	3	To perform a detail plan on how to execute the program relevant to environment and sustainability.	CO5-PO6 DP1: Depth of Knowledge (DK3, DK4, DK6 & DK7)
	4	To give ideas on engagement of the industrial linkage and community, or any of collaboration and sponsorship.	CO5-PO6 DP6: Extent of stakeholder involvement
	5	To present the comprehensive proposal through group presentation the specified format as described in **Section 5** indicating all **Task 1- 5.**	CO5-PO6 A3
Implementation and Organisation			
Submission of Final Report (Group and Individual) (Week 14)			
FINAL	**6**	Submit a report using the specified format as described in **Section 6** indicating all **Task 6-9**.	CO6-PO6 DK7:Knowledge of Issues and Approaches

4.0 Assessment

The assessments are carried out by the lecturer based on the four (4) tools with the allocation of percentage as shown below

Mapping of CO-PO, Assessment, tool, percentage of mark distribution

No	CO-PO	Taxonomy Level/DP/DK	Assessment Tool	%
1	CO4-PO6	A3/DK/DP	Proposal presentation (A3) Organisation (A3)	30%
2	CO4-PO6	C3	Final report (group) Reflection report (Individual)	10%

5.0 Format of Proposal Presentation

Content of presentation shall follow the given tasks (Please refer the rubrics)

No	Item
A	Front slide- Names, Group, Name of project
B	Introduction/background of study (**Task 1a**). Evaluation of identified problems related to environment sustainability (**Task 1b**) Observation and assessment of problem related to environment sustainability (**Task 1c**)
C	Explanation on the objectives, mission and the significance of the proposed project **(Task 2a)** Participation of a group members that reflect behavior in guiding of making planning, ideas and execution of proposed project by applying the SDG initiatives relevant to the problems **(Task 2b).**
D	Response to the questions on the execution and implementation of the proposed program with detail elaboration of action plan relevant to environment and sustainability (**Task 3**)
E	Brief idea of the industrial linkage and community engagement or any collaboration and sponsorship (**Task 4**)
F	Details timeline of the project (**Task 5**)

Performance Criteria Matrix/Rubrics for Proposal Presentation (40M) (CO4-PO7)						
Performance Criteria	**Defined Engineering Problem Characteristics /Taxonomy Level**	**Description of Performance Criteria**				
(Task 1a) **Introduction/ Background of Study** Identification of key problems using relevant Knowledge Profiles	**DP1:** Depth of Knowledge Required = cannot be resolved without extensive practical knowledge as reflected in DK6 supported by theoretical knowledge defined in DK3 and DK4 **DP4: Familiarity of issues**: Infrequently encountered issues **DP2: Conflicting requirement:** Involve several issues, but with few of these exerting conflicting constraints	*Ability to brainstorm and identify the specific content or problem that relevant with the given title faced by the chosen community, within the environment and sustainability contexts, and relevant to engineering practices, based on specified knowledge profiles namely:* ***(DK3: Engineering Fundamental; DK4: Specialist Knowledge, DK6 – Practical Engineering Knowledge; and DK7- Knowledge of Issues and Approaches***				
		1	**2**	**3**	**4**	**5**
		Very Poor	**Poor**	**Satisfactory**	**Good**	**Very Good**
		Demonstrate only two (2) or less specified of DKs	Demonstrates only three (3) specified DKs	Acceptable demonstration of all four (4) specified DKs	Good demonstration of all four (4) specified DKs	Excellent demonstration of all four (4) specified DKs
(Task 1b) Evaluation of identified problems related to environment sustainability		*Ability to evaluate the infrequently encountered issue/problem under various circumstances related to* ***economic, social, health, safety, environmental and sustainability*** *relevant to chemical engineering practices towards providing effective solutions.*				
		1	**2**	**3**	**4**	**5**
		No evaluation of any circumstance	Evaluate 1 circumstances with acceptable justification	Evaluate 2 circumstances with acceptable justification	Evaluate 3 circumstances with acceptable justification	Evaluate more than 3 circumstances with acceptable justification
(Task 1c) Observation and assessment of problem related to environment sustainability		*Ability to discuss what the community do and how they* ***interact with their environment*** *that contributes to the problem and come out with assessment of the problem related and supported by environment and sustainability sources.*				
		1	**2**	**3**	**4**	**5**
		Lack of supporting sources (not valid and not relevant)	Supported by 2 sources literature search but not relevant and validated	Supported by 2 sources of literature search	Supported by 3 sources of literature search	Supported by more than 3 sources of literature search

<table>
<tr><td rowspan="5">(Task 2a)

Explanation on the objectives, mission, and the significance of the proposed project
(Task 2a)

Participation of a group members that reflect behavior in guiding of making planning, ideas and execution of proposed project by applying the SDG initiatives relevant to the problems
(Individual)</td><td rowspan="5">DP3: Depth of analysis
Can be solved in standardized ways</td><td colspan="5">Ability to explain and discuss on the proposed project in form of the objectives, mission, and the significance of the project in relation to the Sustainable Development Goals</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>Very poor explanation without any form of suitable SDG</td><td>Poor explanation with poor elaboration SDG</td><td>Acceptable explanation with acceptable elaboration SDG</td><td>Clear and substantial explanation with some elaboration of SDG</td><td>Clear and comprehensive explanation with detail elaboration related to SDG</td></tr>
<tr><td colspan="5">Ability of each group member to show active roles during the presentation (that reflect behavior that guides in making planning, ideas and execution of proposed project by applying the SDG initiatives</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>Focus of the presentation is on one group member only</td><td>Not all group members have an active role in the presentation</td><td>Partial of the group members have an active role in the presentation</td><td>All group members have a relatively active role in the presentation</td><td>All group members have an active role in the presentation</td></tr>
<tr><td rowspan="3">(Task 3)

Response to the questions on the execution and implementation of the proposed program with detail elaboration of action plan relevant to environment and sustainability
(Individual)</td><td rowspan="3">PO6: Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts.</td><td colspan="5">Ability to respond to questions with elaboration on environment and sustainability to the implementation/execution of the proposed program</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>Unable to response and no elaboration on issues</td><td>Poor response with lack of elaboration on issues</td><td>Respond well with acceptable elaboration on the issues</td><td>Respond quite well with substantial elaboration on the issues</td><td>Respond very well with comprehensive elaboration on the issues</td></tr>
</table>

(Task 4) Brief idea of the industrial linkage and community engagement or any collaboration and sponsorship	**DP6 – Extent of stakeholder involvement & conflicting requirements** involve a limited range of stakeholders with differing needs	*Ability to brief the ideas on industrial linkages and community engagement* or any collaboration and sponsorship				
		1	**2**	**3**	**4**	**5**
		No engagement/ collaboration/ sponsorship	Poor level of ideas on engagement/ collaboration/ sponsorship	Acceptable level of ideas on engagement/ collaboration/ sponsorship	Good level of ideas engagement/ collaboration/ sponsorship	High level of ideas engagement/ collaboration/ sponsorship
(Task 5) Details timeline of the project		Ability to come out with an effective and convenient timeline of the project starting from proposal presentation, planning, execution of project and submission of the report				
		1	**2**	**3**	**4**	**5**
		A very poor timeline and lacking with planning	A poor timeline with planning	An acceptable timeline with good planning	A good, complete, and convenient timeline with good planning	A comprehensive, and convenient timeline with good planning

Performance Criteria Matrix/Rubrics for Implementation and Organisation (30M) (CO4-PO7)						
Performance Criteria	**Defined Engineering Problem Characteristics /Taxonomy Level**	**Description of Performance Criteria**				
Planning and Coordination Measured by the completion of tasks and adherence to timelines, with specific percentages for delays	**DP1- in-depth of knowledge required.** **DP1** cannot be resolved without extensive practical knowledge as reflected in **DK6 and DK7** supported by theoretical knowledge defined in **DK3 and DK4** **Required DKs** are: **DK3**: A systematic, theory-based formulation of **engineering fundamentals** required in the engineering discipline **DK4: Engineering specialist knowledge** **DK6: Practical engineering knowledge** **DK7: Knowledge of Issues and Approaches**	*Ability to design a clear and organized project plan, ensuring proper coordination among all members, with clearly defined tasks, roles, and deadlines to achieve project objectives efficiently.*				
		1	**2**	**3**	**4**	**5**
		Very Poor	**Poor**	**Satisfactory**	**Good**	**Very Good**
		Little to no planning or coordination is evident in the organization of the program.	Program planning is weak, and coordination among members is minimal.	Program has some planning but lacks clarity in coordination and timelines.	Program is well-planned with minor gaps in coordination and timing	Program is thoroughly planned with detailed steps, timelines, and clear coordination among team members.
Teamwork and Collaboration Quantified by the percentage of team members contributing and the effectiveness of communication.		*Ability to work effectively in a team, contributing equally and collaborating with others to achieve project goals while maintaining open communication and mutual respect within the group.*				
		1	**2**	**3**	**4**	**5**
		Little to no teamwork, with members working in isolation or failing to contribute.	Collaboration is weak, with minimal interaction and unequal contributions.	Teamwork is adequate, though some members contribute more than others.	Good teamwork, with most members contributing effectively and supporting each other.	Exceptional collaboration among team members, with active participation and strong leadership.
Engagement with Society Focuses on how well the program involves and benefits the community.		*Ability to engage and interact meaningfully with the community, ensuring the program directly addresses societal needs, while fostering participation and positive relationships with community members.*				
		1	**2**	**3**	**4**	**5**
		No meaningful engagement with the community; program is disconnected from societal problems	Minimal engagement with the community; program has little connection to societal needs.	Some engagement with the community, but the impact is limited.	Program engages the community but lacks depth in addressing all needs.	Program engages the community effectively, addressing the needs and involving participants meaningfully.

Resource Management Evaluated by the percentage of budget and time overruns.	**DK7: Knowledge of Issues and Approaches** **DP2 – Range of conflicting requirements:** involve several issues, but with few of these exerting conflicting constraints **DP3 – Depth analysis required**: **DP4: Familiarity of issues:** are frequently encountered and thus familiar to most practitioners in the practice area. **DP6 – Extent of stakeholder involvement & conflicting requirements** involve a limited range of stakeholders with differing needs	*Ability to manage resources efficiently, including budgeting, time, and materials, ensuring optimal use without waste and maintaining balance between cost and quality throughout the project.*				
		1	**2**	**3**	**4**	**5**
		Very Poor	**Poor**	**Satisfactory**	**Good**	**Very Good**
		Resource management is ineffective, exceeding budget or timeline by more than 30%.	Resource management is poor, exceeding budget or timeline by 21-30%.	Resource management is adequate but exceeds budget or timeline by 11-20%.	Manages resources well, exceeding budget or timeline by up to 10%.	Manages resources (budget, materials, time) efficiently, staying within 100% of budget and timelines.
Problem Solving and Adaptability Measured by the percentage of issues resolved independently and adaptability to changes.		*Ability to identify and solve problems effectively during the project, demonstrating adaptability and making necessary adjustments to keep the project on track despite unforeseen challenges.*				
		1	**2**	**3**	**4**	**5**
		Fails to resolve issues or adapt to changes, resulting in significant problems and delays.	Resolves less than 60% of issues, struggles to adapt, causing delays or problems in execution.	Resolves 60-79% of issues with assistance and adapts to some changes, but impact is noticeable.	Resolves most issues (80-99%) independently, with minor external help, and adapts fairly well to changes.	Resolves 100% of issues independently and adapts effectively to changes, minimizing negative impact.
Leadership and Decision Making Assessed by the percentage of effective decisions made and their impact on the program.		*Ability to demonstrate strong leadership by making informed, timely decisions that guide the team and project in the right direction, while taking responsibility for outcomes and fostering a collaborative working environment.*				
		1	**2**	**3**	**4**	**5**
		Lacks leadership; decisions are ineffective, leading to significant negative outcomes (<30%).	Limited leadership; many decisions are ineffective, causing delays or confusion (30-49%).	Leadership is inconsistent; some decisions are effective, but many need improvement (50-69%).	Shows strong leadership, making mostly effective decisions (70-89% of decisions effective).	Demonstrates proactive leadership, making well-informed decisions that positively impact the program (>90% of decisions effective).

6.0 Format of Final Report (Group)

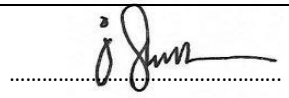
Content of report shall follow the given tasks (Please refer the rubrics)

A	Front Page – Names, UiTM no, Group, Name of Project	Page
B	Table of Contents	
C	List of Tables and Figures	
D	**Problem Statement (Task 6)** • Introduction/background of study • Evaluation of identified problems related to environment sustainability • Observation and assessment of problem related to environment sustainability	Max 1 page
E	**Proposed Project (Task 7)** • Generation of ideas to come out with many (multiple) suggestions to solve the problems. Explain the conduct of brainstorming sessions and propose possible solutions that may help to solve the community's problems • Explanation on the objectives, mission and the significance of the proposed project • Detail discussion on the proposed project in making planning, ideas and execution of proposed project by applying the SDG initiatives relevant to the problems	Max 1 page
F	**Final/Implementation/Execution (Task 8)** • Explanation on the execution and implementation of the proposed program with detail elaboration of action taken relevant to environment and sustainability • Engagement of industrial linkage and community or any collaboration and sponsorship • Engagement with community to test the solutions to the problems/impact to the community	Max 1 page
E	**Task 9** **Final Report** needs to follow the required format • Challenges faced and discussion on potential solution • Timeline • General format: Font: Arial (size 11 single spacing) • References	Max 1 page
	Maximum pages including References	4 pages

Performance Criteria Matrix/Rubrics for Final Report (30M (CO4-PO6)						
Performance Criteria	**Defined Engineering Problem Characteristics /Taxonomy Level**	**Description of Performance Criteria**				
(Task 6) **Introduction/ Background of Study** Identification of key problems related to environment sustainability	**DP1:** Depth of Knowledge Required = cannot be resolved without extensive practical knowledge as reflected in DK6 supported by theoretical knowledge defined in DK3 and DK4	*Ability to evaluate the infrequently encountered issue/problem under various circumstances related to **economic, social, health, safety, environmental and sustainability** relevant to chemical engineering practices towards providing effective solutions.*				
		1	**2**	**3**	**4**	**5**
		Very Poor	**Poor**	**Satisfactory**	**Good**	**Very Good**
		No evaluation of any circumstance	Evaluate 1 circumstances with acceptable justification	Evaluate 2 circumstances with acceptable justification	Evaluate 3 circumstances with acceptable justification	Evaluate more than 3 circumstances with acceptable justification
(Task 7) **Proposed project** Explanation on the objectives, mission and the significance of the proposed project	**DP4: Familiarity of issues**: Infrequently encountered issues **DP2: Conflicting requirement:** Involve several issues, but with few of these exerting conflicting constraints	*Ability to explain and discuss on the proposed project in form of the objectives, mission and the significance of the project in relation to the Sustainable Development Goals*				
		1	**2**	**3**	**4**	**5**
		Very poor explanation without any form of SDG	Poor explanation with poor elaboration SDG	Acceptable explanation with acceptable elaboration SDG	Clear and substantial explanation with some elaboration of SDG	Clear and comprehensive explanation with detail elaboration related to SDG
(Task 8) **Execution and Implementation** Explanation on the execution and implementation of the proposed program with detail elaboration of action taken relevant to environment and sustainability	**DP4: Familiarity of issues**: Infrequently encountered issues **DP3: Depth of analysis** Can be solved in standardized ways	Ability to explain and elaborate the execution and implementation of proposed project with details action plan relevant to environment and sustainability				
		1	**2**	**3**	**4**	**5**
		Very poor explanation on execution project without action taken	Poor explanation on execution project with poor action taken	Acceptable explanation on execution project with acceptable action taken	Clear and substantial explanation on execution project with some elaboration of action taken	Clear and comprehensive explanation on execution project with detail elaboration of action taken

(Task 9) **Final Report** needs to follow the required format i. Indicate all tasks from Task 6-9 ii. Challenges faced and discussion on potential solution iii. Timeline	*Ability to submit a complete and quality report based on the following elements (1) Include all the task from Task 6- 9, (2) Challenges faced and discussion on potential solution*				
	1	**2**	**3**	**4**	**5**
	A very poor report and lacking the three requirements	A poor report that almost fulfills all three requirements	An acceptable quality report that fulfills all three requirements	A good, complete, and high-quality report that fulfills all three requirements	A comprehensive and high-quality report that fulfills all three requirements

Performance Criteria Matrix for Reflection Report (10 M) (CO4-PO6) – Individual Assessment						
Performance Criteria	**Defined Engineering Problem Characteristics /Taxonomy Level**	**1**	**2**	**3**	**4**	**5**
		Very Poor	**Poor**	**Satisfactory**	**Good**	**Very Good**
		Description of Performance Criteria				
A. Demonstration of SDGs definition and justification of SDGs practice relevant to the problem	PO7: Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts. (DK7)	*Ability to demonstrate the definition of SDGs and evaluate the sustainability and impacts relevant to the problem*				
		1	**2**	**3**	**4**	**5**
		Very poor reflection on SDG and very poor explanation of the sustainability and impacts relevant to the problem	Poor reflection on SDG and poor explanation of the sustainability and impacts relevant to the problem	Acceptable reflection on SDG and acceptable explanation of the sustainability and impacts relevant to the problem	Good reflection on SDG with good explanation of the sustainability and impacts relevant to the problem	Excellent demonstration on SDG with complete explanation of the sustainability and impacts relevant to the problem
B. Comprehension of the role of engineers in society on identified issues related to environmental and sustainability	WK7: Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability	*Ability to understand and comprehend the role of engineers in society on identified issues related to environment and sustainability*				
		1	**2**	**3**	**4**	**5**
		Very poor understanding and comprehension on the identified issues related to *environment and sustainability*	Poor understanding and comprehension on the identified issues related to *environment and sustainability*	Adequate understanding and comprehension on the identified issues related to *environment and sustainability*	Good understanding and comprehension on the identified issues related to *environment and sustainability*	Excellent understanding and comprehension on the identified issues related to *environment and sustainability*
Maximum pages						**1 Page**

Prepared by RP CHE332:

(**ISWAIBAH BINTI MUSTAFA**)
Date: 21.09.2024