



PANEL : _____ DIVISION : _____

STUDENT : _____ STUDENT ID : _____

PROJECT TITLE: _____

A. PRESENTATION	Weightage	E,F,D <43%	D+,C- 44-49%	C, C+ 50-59%	B-,B 60-69%	B+,A- 70-79%	A, A+ 80-100%	SUB-TOTAL MARK (%)
Technical/Method/ Design Power Point (CO5-PO10)	10							
Communication Skill (CO5-PO10)	15							
Presentation Skill (CO5-PO10)	15							
Content of Presentation (CO5-PO10)	30							
Discussion Q&A (CO5-PO10)	30							
A. Sub-Total Marks	A* = (A) _____ X 0.05 = _____							
REPORT WRITING	Weightage	E,F,D <43%	D+,C- 44-49%	C, C+ 50-59%	B-,B 60-69%	B+,A- 70-79%	A, A+ 80-100%	SUB-TOTAL MARK (%)
Problem Statement (CO1-PO2)	5							
Objectives (CO1-PO2)	5							
Scope of work (CO1-PO2)	5							
Literature Review (CO1-PO2)	5							
Research Methodology (CO2-PO4)	10							
Data Collection (CO2-PO4)	10							
Results & Analysis (CO2-PO4)	20							
Discussion (CO3-PO5)	20							
Conclusion & Recommendations (CO3-PO5)	5							
References (CO6-PO12)	5							
Lifelong Learning Skills (CO6-PO12)	10							
Sub-Total	100							
B. Sub-Total Marks	B* = (B) _____ X 0.20 = _____							

TOTAL MARKS = (A*) _____ + (B*) _____ = _____

Note: Sub-Total Mark x Weightage, i.e if '50' mark is given:

Sub-Total mark = 50 x 0.05 (for weightage 5) = 2.5

= 50 x 0.20 (for weightage 20) = 10

Panel II Signature: _____

Date: _____



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PERFORMANCE CRITERIA (RUBRICS) ON ASSESSMENT OF REPORT WRITING (FYP II) BY FACULTY PANEL AND SUPERVISOR

TO MEASURE (CO1-PO2) (CO2-PO4) (CO3-PO5) (CO6-PO12) ADDRESSING COMPLEX ENGINEERING PROBLEMS WP1 (Depth knowledge with demonstration of WK3, WK4, WK6 & WK8) & WP3 (In-depth analysis: No Obvious Solution), WP4 (Infrequently Encountered Issues) & WP7 (Interdependence)

Components/ Taxonomy Domain	Weightage	Complex Engineering Problems (WP & WK)	E, F, D, ≤ 43%	D+, C- 44-49%	C, C+ 50-59%	B-, B 60-69%	B+, A- 70-79%	A, A+ 80-100%
			<i>Weak</i>	<i>Poor</i>	<i>Average</i>	<i>Satisfactory</i>	<i>Good</i>	<i>Excellent</i>
Objectives (CO1-PO2) Cognitive (C5)	5	WP1: Depth of Knowledge Required = in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 (WK's) fundamental, first principles analytical approach	Ability to establish objectives that are SMART with correct usage of verbs consistent with problem statement, scope of work, methodology and conclusions					
			Not able to identify objectives.	Identify the objectives of the study. However, objectives are non-SMART (Specific, Measurable, Achievable, Realistic and Timeliness) with incorrect usage of verbs.	Identify the objectives of the study which are SMART with correct usage of verbs.	Determine at least two numbers of objectives in line with problem statements. Objectives are SMART with correct usage of verbs.	Establish at least two numbers of objectives that are SMART with correct usage of verbs consistent with problem statement and scope of work.	More than two numbers of objectives that are SMART with correct usage of verbs consistent with problem statement, scope of work, methodology and conclusions.
Scope of Work (CO1-PO2) Cognitive (C5)	5	Demonstration of specified knowledge profiles WK3 – Fundamental Knowledge WK4 – Specialist Knowledge WK6- Engineering Practices WK8 – Research Literature	Ability to establish activities that are consistent with elements: (1) objectives, (2) problem statement, (3) methodology that include (4) limitations. Flow of activities presented briefly on the followings (1) methodology, (2) apparatus/techniques to be adopted, (3) parameters/variables to be measured and (4) tools used for analysis.					
			Not able to identify main activities undertaken.	Identify main activities undertaken. However, the activities indicated are inconsistent with objectives and problem statement.	Identify activities and consistent with objectives and problem statement.	Outline activities that are consistent with objectives, problem statement and methodology showing the limitation of the work.	Establish activities that are consistent with the objectives, problem statement and methodology showing the limitation of the work. Flow of activities are provided.	Establish activities that are consistent with all 4 elements with complete flow of 4 activities



Problem Statement (C01-PO2) Cognitive (C5)	5	WP4: Familiarity of issues = infrequently encountered issues WP1: Depth of Knowledge Required = in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 (WK's) fundamental, first principles analytical approach WP7: Interdependence = high level problems with many parts & sub-problems	Ability to formulate the problems statement incorporating all the three elements namely: 1) What is the current situation (brief literature review of similar works)? 2) What is wrong with the current situation (issues/problems regard to similar area of study)? 3) What needs more to be done?					
			Poor identification of all the three elements with poor problem statement	Problem statement has only one of the elements however, it is inconsistent with the title.	Problem statement has only two of the elements that are consistent with the title.	Acceptable formulation of problem statement three elements consistent with the title.	Good formulation of problem statement three elements consistent with the title.	Excellent formulation of problem statement with all three (3) elements that are consistent with the title.
			Ability to differentiate the infrequently encountered issues in order to analyze the problem by demonstrating the specified knowledge profiles (WK3 – Fundamental Knowledge, WK4 – Specialist Knowledge, WK6- Engineering Practices & WK8 – Research Literature)					
			Not able to identify issues/problems and no WK is demonstrated	Lack of ability to identify issues/problems with only 1 WK	There is evidence of issues/problems highlighted but indirectly related to the intended study with only two (2) WKs	Able to identify issues/problems directly related to the intended study based on two (2) WKs	Able to differentiate and analyze the issues/problems directly related to the intended study based on three (3) WKs	Able to differentiate and analyze the issues/problems directly related to the intended study using all four (4) specified WKs
Literature Review (C01-PO2) Cognitive (C5)	5	(Continued from above)	Ability to formulate and provides proposal of suitable measures to resolve issues					
			Not able to establish any shortcoming	Poor proposal of measures with few short coming	Establish the shortcomings with brief proposal of suitable measures.	Establish the shortcomings with good proposal of suitable measures.	Establish the shortcomings with substantial proposal of suitable measures.	Establish the shortcomings with some justifications. Comprehensive proposals of suitable measures are also included.
			Ability to carry out a systematic literature review (interdependence with many parts) on the following elements: (1) adapt related theories/ concept and studies on the subject area (2) integrate the previous findings and conclude the uniqueness of the present work (3) Proper citations (include figures and tables taken from various sources) (4) Summary of important information given, (5) Materials organized according to theme with evidence of good organization and (6). Provide some form of justifications on why research should proceed					
Very poor review and not able to identify relevant themes to review.	Poor review with a summary of general literature related to the topic. Write-up consists of merely a copy and paste job, rewritten facts and full of annotations.	An acceptable review with little analysis on the previous research and with limited coverage of related theories/ concept and studies on the subject area. Improper citations are evident. Materials organized according to chronology and not according to theme.	A good and a sensible review with sufficient coverage of related theories/ concept and studies on the subject area with appropriate references. Materials organized according to chronology and not according to theme.	A systematic literature review to establish substantial coverage of related theories/ concept and studies on the subject area. Proper citations (include figures and tables taken from various sources). Materials organized according to theme. There is some evidence of good organization.	A very systematic literature review incorporating all six (6) elements above			



Research Methodology (C02-PO4) Psychomotor (P4)	10	WP3: Depth of analysis = no obvious solution, abstract thinking, originality	Ability to outline and propose complete methodological framework/components (consistent with the following elements (1) objectives (2) scope of work, (3) adopt the standard method of measurements (even if it is not a standard method of measurement, proper justifications citation is required), (4) comprehensive evidence of data collection planning programme is given, (5) Flow of proposed activities (measurement/test run/calibration etc) are shown and (6) Flow of proposed activities/ with acceptable justification					
			Not able to identify research activities that will be undertaken.	Methodological Framework outlined not consistent with objectives and scope of work. No evidence of data collection planning programme.	Methodological Framework outlined consistent with objectives and scope of work but do not follow the standard method of measurements. Some evidence of data collection planning programme is given.	Methodological Framework outlined are consistent with objectives and scope of work and adopt the standard method of measurements (even if it is not a standard method of measurement, proper citation is required). Some evidence of data collection planning programme is given.	Methodological Framework outlined are consistent with objectives and scope of work and adopt the standard method of measurements (even if it is not a standard method of measurement, proper justifications and citations are required). Some evidence of data collection planning programme is given.	Methodological Framework outlined are consistent with all of the above elements.
Data Collection (C02-PO4) Psychomotor (A4)	10		Ability to explain and justify the proposed specific tools/techniques (with justifications and comparisons with other tools) that are relevant to objectives and proposed tools are supported with previous studies/ theory and demonstrate WK6 (Engineering Practices)					
			Not able to propose any tool usage / techniques with no justification	Identify some tools / techniques but irrelevant with objectives and lack of justification	Identify some tools / techniques that are consistent with objectives with some justifications	Highlight specific tools / techniques (with acceptable justifications) that are relevant to objectives	Highlight specific tools / techniques (with substantial justifications) that are relevant to objectives	Explain in detail the specific tools / techniques (with justifications and comparisons with other tools) that are relevant to objectives. The proposed tools are supported with previous studies/ theory and with excellent justifications



Results and analysis (CO2-PO4) Psychomot or (A4)	20	WP1: Depth of Knowledge Required = in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 (WK's) fundamental, first principles analytical approach Demonstration of specified knowledge profiles WK3 – Fundamental Knowledge WK4 – Specialist Knowledge WK6- Engineering Practices WK8 – Research Literature	Ability to exhibit the significant results based on the project objectives with a proper discussion and analysis.					
			No Results and analysis	Results do not meet the project's objectives	All/ few results validate some of the project's objectives with inaccurate or wrong analysis	Few results validate some of the project's objectives with correct analysis	All/ most results validate some of the project's objectives with correct analysis	All results validate all of the project's objectives with correct analysis
Discussion (CO3-PO5) Cognitive (C5)	20	Demonstration of specified knowledge profiles WK3 – Fundamental Knowledge WK4 – Specialist Knowledge WK6- Engineering Practices WK8 – Research Literature	Ability to construct a concise, sensible and in-depth discussion of data in relation to research question. Complete, critical and balanced discussion of strengths, limitations, new insights and hypotheses. Critical discussion of how the data relate to current knowledge of the subject					
			No discussion is present	Discussion present do not meet the project's results and research question	All/ few discussion relates to the project's results and analysis with incorrect interpretation	Few discussion relates to the project's results and analysis with correct interpretation. Only few of the results and its relation to the hypotheses and current knowledge are discussed.	All/ most discussion relates to the project's results and analysis with correct interpretation. Some of the results and its relation to hypotheses and current knowledge are discussed.	All discussion relates to the project's results and analysis with correct interpretation. All results and relation to the hypotheses and current knowledge are discussed critically.
Conclusion and recommendation (CO3-PO5) Cognitive (C5)	5	WP3: Depth of analysis = no obvious solution, abstract thinking, originality	Ability to make conclusions from the findings derived from the collected & analysed data and answer objectives					
			No attempt was made to conclude, and objectives of the experiment were not answered. No recommendation made	Conclusion is derived from the data but the objective of the experiment were not answered. Make some recommendation	Conclusion is derived from the collected and analysed data, but it is not answering the objectives. Make some relevant recommendation	Conclusion is good and derived from the collected and analysed data and not from other sources but did not directly answering the objectives. Make good recommendation	Conclusion is good and derived from the collected and analysed data and not from other sources and directly answer the objectives. Good recommendation	Conclusion is excellent and derived from the collected and analysed data and not from other sources. Conclusion clearly answers the objectives. Very good recommendation for future study



References (C06-PO12) Affective (A5)	5	No Complex Problems	Ability to demonstrate WK8 (Literature Search) using relevant citations and references from various validated resources such as (refereed/non-refereed proceeding and refereed journals)					
			References are merely from website. No citations in the text	References include articles from website, books, newspaper and magazines. Most of the citations are missing	References include articles from website, books, newspaper and magazines and 5 to 6 articles from non-refereed/refereed proceedings of conferences. Some citations are missing	References include articles from website, books, newspaper and magazines and 7 to 8 from non-refereed/refereed proceedings of conferences and 1 to 2 from refereed journals. Citations are included but some are wrongly cited.	References more than eight (8) from non-refereed/refereed proceedings of conferences and 3 to 4 from refereed journals. Citations are included and consistent with references.	Excellent citations and references include more than eight (8) from non-refereed/refereed proceedings and more than five (5) refereed journals.
Lifelong Learning skills (C06-PO12) Affective (A5)	10		Ability to demonstrate the life-long learning skill by exploring the topic at some levels and response in different effort on the information indicating interest in the subject					
			Explore a topic at a very surface level and identifies information to the very basic facts indicating lack or no interest in the subject	Explore a topic at a surface level and identifies information to the very basic facts indicating very low interest in the subject.	Explore a topic at a surface level, providing little insight and/or information beyond the basic facts indicating low interest in the subject.	Explore a topic with some evidence of depth, providing occasional insight and/or information indicating mild interest in the subject.	Explore a topic in depth, yielding insight and/or information indicating interest in the subject.	Explore a topic in depth, yielding a rich awareness and/or little-known information indicating intense interest in the subject.

CO1: Systematically collect, analyze and select suitable method of presenting the data	PO2 – Problem Analysis: Identify, formulate, conduct research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (WK1 to WK4);
CO2: Implement the research design/methodology for a given topic	PO4: Investigation: Conduct investigation of complex engineering problems using research-based knowledge (WK8) and research methods, including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
CO3: Draw conclusions from the analyzed data	PO5: Modern Tool Usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations (WK6);
CO6: Demonstrate autonomous learning in preparing the experimental project/case study	PO12: Lifelong Learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



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PERFORMANCE CRITERIA (RUBRICS) ON ASSESSMENT OF (SLR-OPTION) REPORT WRITING (FYP II) BY FACULTY PANEL AND SUPERVISOR

TO MEASURE (CO1-PO2) (CO2-PO4) (CO3-PO5) (CO6-PO12) ADDRESSING COMPLEX ENGINEERING PROBLEMS WP1(Depth knowledge with demonstration of WK3, WK4, WK6 & WK8) & WP3 (In-depth analysis: No Obvious Solution), WP4 (Infrequently Encountered Issues) & WP7 (Interdependence)

Components/ Taxonomy Domain	Weightage	Complex Engineering Problems (WP & WK)	E, F, D, ≤ 43%	D+, C- 44-49%	C, C+ 50-59%	B-, B 60-69%	B+, A- 70-79%	A, A+ 80-100%
			<i>Weak</i>	<i>Poor</i>	<i>Average</i>	<i>Satisfactory</i>	<i>Good</i>	<i>Excellent</i>
Objectives (CO1-PO2) Cognitive (C5)	5	WP1: Depth of Knowledge Required = in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 (WK's) fundamental, first principles analytical approach	Ability to establish objectives that are SMART with correct usage of verbs consistent with problem statement, scope of work, methodology and conclusions					
			Not able to identify objectives.	Identify the objectives of the study. However, objectives are non-SMART (Specific, Measurable, Achievable, Realistic and Timeliness) with incorrect usage of verbs.	Identify the objectives of the study which are SMART with correct usage of verbs.	Determine at least two numbers of objectives in line with problem statements. Objectives are SMART with correct usage of verbs.	Establish at least two numbers of objectives that are SMART with correct usage of verbs consistent with problem statement and scope of work.	More than two numbers of objectives that are SMART with correct usage of verbs consistent with problem statement, scope of work, methodology and conclusions.
Scope of Work (CO1-PO2) Cognitive (C5)	5	Demonstration of specified knowledge profiles WK3 – Fundamental Knowledge WK4 – Specialist Knowledge WK6- Engineering Practices WK8 – Research Literature	Ability to establish activities that are consistent with elements: (1) objectives, (2) problem statement, (3) methodology that include (4) limitations. Flow of activities presented briefly on the followings (1) methodology, (2) apparatus/techniques to be adopted, (3) parameters/variables to be measured and (4) tools used for analysis.					
			Not able to identify main activities undertaken.	Identify main activities undertaken. However, the activities indicated are inconsistent with objectives and problem statement.	Identify activities and consistent with objectives and problem statement.	Outline activities that are consistent with objectives, problem statement and methodology showing the limitation of the work.	Establish activities that are consistent with the objectives, problem statement and methodology showing the limitation of the work. Flow of activities are provided.	Establish activities that are consistent with all 4 elements with complete flow of 4 activities



Problem Statement (C01-PO2) Cognitive (C5)	5	WP4: Familiarity of issues = infrequently encountered issues WP1: Depth of Knowledge Required = in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 (WK's) fundamental, first principles analytical approach WP7: Interdependence = high level problems with many parts & sub-problems	Ability to formulate the problems statement incorporating all the three elements namely: 1) What is the current situation (brief literature review of similar works)? 2) What is wrong with the current situation (issues/problems regard to similar area of study)? 3) What needs more to be done?					
			Poor identification of all the three elements with poor problem statement	Problem statement has only one of the elements however, it is inconsistent with the title.	Problem statement has only two of the elements that are consistent with the title.	Acceptable formulation of problem statement three elements consistent with the title.	Good formulation of problem statement three elements consistent with the title.	Excellent formulation of problem statement with all three (3) elements that are consistent with the title.
			Ability to differentiate the infrequently encountered issues in order to analyze the problem by demonstrating the specified knowledge profiles (WK3 – Fundamental Knowledge, WK4 – Specialist Knowledge, WK6- Engineering Practices & WK8 – Research Literature)					
			Not able to identify issues/problems and no WK is demonstrated	Lack of ability to identify issues/problems with only 1 WK	There is evidence of issues/problems highlighted but indirectly related to the intended study with only two (2) Wks	Able to identify issues/problems directly related to the intended study based on two (2) Wks	Able to differentiate and analyze the issues/problems directly related to the intended study based on three (3) Wks	Able to differentiate and analyze the issues/problems directly related to the intended study using all four (4) specified Wks
Ability to formulate and provides proposal of suitable measures to resolve issues								
Not able to establish any shortcoming	Poor proposal of measures with few short coming	Establish the shortcomings with brief proposal of suitable measures.	Establish the shortcomings with good proposal of suitable measures.	Establish the shortcomings with substantial proposal of suitable measures.	Establish the shortcomings with some justifications. Comprehensive proposals of suitable measures are also included.			
Literature Review (C01-PO2) Cognitive (C5)	5		Ability to carry out a systematic literature review (interdependence with many parts) on the following elements: (1) adapt related theories/ concept and studies on the subject area (2) integrate the previous findings and conclude the uniqueness of the present work (3) Proper citations (include figures and tables taken from various sources) (4) Summary of important information given, (5) Materials organized according to theme with evidence of good organization and (6). Provide some form of justifications on why research should proceed					
			Very poor review and not able to identify relevant themes to review.	Poor review with a summary of general literature related to the topic. Write-up consists of merely a copy and paste job, rewritten facts and full of annotations.	An acceptable review with little analysis on the previous research and with limited coverage of related theories/ concept and studies on the subject area. Improper citations are evident. Materials organized according to chronology and not according to theme.	A good and a sensible review with sufficient coverage of related theories/ concept and studies on the subject area with appropriate references. Materials organized according to chronology and not according to theme.	A systematic literature review to establish substantial coverage of related theories/ concept and studies on the subject area. Proper citations (include figures and tables taken from various sources). Materials organized according to theme. There is some evidence of good organization.	A very systematic literature review incorporating all six (6) elements above



Research Methodology (C02-PO4) Psychomotor (P4)	10	WP3: Depth of analysis = no obvious solution, abstract thinking, originality	Ability to outline and propose complete methodological framework/components consistent with the following elements (1) comprehensive evidence of data collection planning for the secondary data set for subject of interest (2) development of research question on the subject of interest (3) relevancy and place of the topic of interest compared to other studies (4) proper justifications by citation is required					
			No attempt made to describe context of study	Attempt made to place in context, possibly not quite appropriately	General relevance of study in field described	Place of study in field clearly described, some reference to relationship to other studies or topics	Place of study in field clearly described, some reference to relationship to other studies or topics	Place of study in field clearly described, illuminating links to other studies or topic made
Data Collection (C02-PO4) Psychomotor (P4)	10		Ability to explain and justify the secondary data set (consistent with the following elements (1) identification of secondary data set for the subject of interest (2) evaluation of the data set of subject of interest					
		Exhibit a basic/elementary sense of organization (may be purely descriptive or strictly formulaic), but ideas about the topic are generally undeveloped, illogical, irrelevant, or inconsistent	Exhibit a basic/elementary sense of organization (may be purely descriptive or strictly formulaic), and/or development of the topic.	Exhibit insufficient control of focus, organization (way ramble, be repetitious, or locked into a formula), and/or development (it may be mostly descriptive or lack adequate support) of the topic.	Exhibits some control of focus, organization (structure may be formulaic or be organized loosely around the topic), and development (may contain some poorly chosen information, but major ideas are adequately supported).	Exhibits control of focus, organization, and development (all of the subject matter is relevant to the topic, but is not as insightfully selected as a response at level A) of the topic.	Exhibits command of focus, coherent organization, and interesting development (with carefully chosen, insightful details, examples, arguments, etc.) of the topic	



Results and analysis (CO2-PO4) Psychomotor (P4)	20	WP1: Depth of Knowledge Required = in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 (WK's) fundamental, first principles analytical approach	Ability to exhibit deep and width coverage of analysis and comparison with clear evaluation of text's weaknesses or strengths; evaluative criteria are unique and interesting					
			No attempt to present the weaknesses or strengths of the text; no obvious criteria for evaluation.	Poor attempt to present the weaknesses or strengths of the text; no obvious criteria for evaluation.	Insufficient attempt to present the weaknesses or strengths of the text; evaluative criteria are unclear.	Makes some attempt to present the weaknesses or strengths of the text; evaluative criteria are used.	Provides clear evaluation of text's weaknesses or strengths; evaluative criteria are unique and interesting.	Provides excellent evaluation of text's weaknesses or strengths; evaluative criteria are unique and interesting.
Discussion (CO3-PO5) Cognitive (C5)	20	Demonstration of specified knowledge profiles WK3 – Fundamental Knowledge WK4 – Specialist Knowledge WK6- Engineering Practices WK8 – Research Literature	Ability to construct a concise, sensible and in depth discussion of data in relation to research question. Complete, critical and balanced discussion of strengths, limitations, new insights and hypotheses. Critical discussion of how the data relate to current knowledge of the subject					
			No discussion is present	Discussion present do not meet the research question	Only some discussion relates to the research question with deep analysis and only few correct interpretation	Few discussion relates to the research question with deep analysis and correct interpretation. Only few of the secondary data and its relation to the hypotheses and current knowledge are discussed.	All/ most discussion relates to the research question with deep analysis and correct interpretation. Some of the secondary data and its relation to hypotheses and current knowledge are discussed.	All discussion relates to the research question with deep analysis and correct interpretation. All of the secondary data and its relation to hypotheses and current knowledge are discussed critically.
Conclusion and recommendation (CO3-PO5) Cognitive (C5)	5	WP3: Depth of analysis = no obvious solution, abstract thinking, originality	Ability to make conclusions from the findings derived from the collected & analysed secondary data and answer objectives					
			No attempt was made to conclude, and objectives of the experiment were not answered. No recommendation made	Conclusion is derived from the data but the objectives of the experiment were not answered. Make some recommendation	Conclusion is derived from the collected and analysed data, but it is not answering the objectives. Make some relevant recommendation	Conclusion is good and derived from the collected and analysed data and not from other sources but did not directly answering the objectives. Make good recommendation	Conclusion is good and derived from the collected and analysed data and directly answer the objectives. Good recommendation	Conclusion is excellent and derived from the collected and analysed data. Conclusion clearly answers the objectives. Very good recommendation for future study



References (C06-PO12) Affective (A5)	5	No Complex Problems	Ability to demonstrate WK8 (Literature Search) using relevant citations and references from various validated resources such as (refereed/non-refereed proceeding and refereed journals)					
			References are merely from website. No citations in the text	References include articles from website, books, newspaper and magazines. Most of the citations are missing	References include articles from website, books, newspaper and magazines and 5 to 6 articles from non-refereed/refereed proceedings of conferences. Some citations are missing	References include articles from website, books, newspaper and magazines and 7 to 8 from non-refereed/refereed proceedings of conferences and 1 to 2 from refereed journals. Citations are included but some are wrongly cited.	References more than eight (8) from non-refereed/refereed proceedings of conferences and 3 to 4 from refereed journals. Citations are included and consistent with references.	Excellent citations and references include more than eight (8) from non-refereed/refereed proceedings and more than five (5) refereed journals.
Lifelong Learning skills (C06-PO12) Affective (A5)	10		Ability to demonstrate the life-long learning skill by exploring the topic at some levels and response in different effort on the information indicating interest in the subject					
			Explore a topic at a very surface level and identifies information to the very basic facts indicating lack or no interest in the subject	Explore a topic at a surface level and identifies information to the very basic facts indicating very low interest in the subject.	Explore a topic at a surface level, providing little insight and/or information beyond the basic facts indicating low interest in the subject.	Explore a topic with some evidence of depth, providing occasional insight and/or information indicating mild interest in the subject.	Explore a topic in depth, yielding insight and/or information indicating interest in the subject.	Explore a topic in depth, yielding a rich awareness and/or little-known information indicating intense interest in the subject.

CO1: Systematically collect, analyze and select suitable method of presenting the data	PO2 – Problem Analysis: Identify, formulate, conduct research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (WK1 to WK4);
CO2: Implement the research design/methodology for a given topic	PO4: Investigation: Conduct investigation of complex engineering problems using research-based knowledge (WK8) and research methods, including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions;
CO3: Draw conclusions from the analyzed data	PO5: Modern Tool Usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations (WK6);
CO6: Demonstrate autonomous learning in preparing the experimental project/case study	PO12: Lifelong Learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



PERFORMANCE CRITERIA (RUBRICS) ON ASSESSMENT OF PRESENTATION (FYP II) BY FACULTY PANEL

To measure (CO5: Perform oral presentation effectively about the research project in a well-organized and clear manner - PO10: Communicate effectively
Complex Engineering Activities – EA1, EA3, EA4 & EA5)

Components/ Taxonomy Domain & Level	Weightage	Complex Engineering Activities (EA)	E, F, D, ≤ 43%	D+, C- 44-49%	C, C+ 50-59%	B-, B 60-69%	B+, A- 70-79%	A, A+ 80- 100%
			<i>Weak</i>	<i>Poor</i>	<i>Average</i>	<i>Satisfactory</i>	<i>Good</i>	<i>Excellent</i>
Technical/ Method/ Design Powerpoint (CO5-PO10) Affective (A5)	10		Ability to design the method of presentation with creativity and innovativeness (catchy & lively design, facts appropriately highlighted)					
			Design with no creativity (Straight forward bullet point/cluttered design no graphic)	Design with lack of creativity (straight forward bullet point/cluttered design with little graphic)	Design with minimum creativity (simple and informative with minimum graphic)	Moderate design with some creativity (simple and informative with appropriate graphic)	Good design with substantial creativity (simple, informative & facts appropriately highlighted)	Excellent design with high creativity (catchy & lively design, facts appropriately highlighted)
Communication Skill (CO5-PO10) Affective (A5)	15	EA1: Range of Resources: Involve the use of diverse resources (people, money, information, technologies)	Ability to elaborate very clearly, fluently and convincingly on involvement of the use of diverse resources (people, money, materials, information, technologies) in the experimental/case study					
			Involved only one (1) resource with some explanation	Involved only two (2) with few elaboration	Involved three (3) resources with some elaboration	Involved three (3) diverse resources with adequate elaboration	Involved four (4) resources with substantial elaboration	Involved more than four (4) diverse resources with detail elaboration on each resource
Presentation Skill (CO5-PO10) Affective (A5)	15	EA3: Innovation: Creative use of engineering principles and research-based knowledge in novel way	Ability to present convincingly the creative use of engineering principles and research-based knowledge in novel way					
			No creativity and only adapt the current techniques/ processes and but not applicable to solve problem	Lack of creativity and only adapt the current techniques/ processes and applicable to solve problem	Creatively use the engineering principles and research-based knowledge to adapt current techniques/ processes and applicable to solve problem	Creatively use the engineering principles and research-based knowledge to enhance current techniques/ processes to solve problem	Creatively use the engineering principles and research-based knowledge to enhance current techniques/ processes to solve problem	Very creatively use the engineering principles and research-based knowledge on new materials/ techniques/ processes in modified (innovation)/ new ways (invention)



Content of Presentation (CO5-PO10) Affective (A5)	30	EA5: Familiarity of Issues: Extend beyond previous experiences using principle-based approaches	Ability to discuss and explain on the issues related to the research project beyond previous experiences (unfamiliarity) consist of the following elements: (1) Objective (2) Scope of work (3) problem statement (4) significant of study, (5) literature review, (6) methodology, (7) expected outcomes and (8) references					
			Consist of 3-5 elements without proper explanation on issues	Consist of only 5 to 7 elements without proper explanation on issues	Consist of all eight (8) elements with minimum explanation on very familiar issues	Consist of all eight (8) elements with moderate explanation on familiar issues	Consist of all eight (8) elements with good explanation on familiar issues	Consist of all eight (8) elements with excellent explanation on unfamiliar issues
Discussion Q & A (CO5-PO10) Affective (A5)	30	EA4: Consequences to society and environment: highlight significant consequences, characterized by difficulty of prediction & mitigation	Ability to discuss and justify the consequences to society and environment: highlight significant consequences, characterized by difficulty of prediction & mitigation					
			Unable to respond and answer	Able to respond and answer without relevancy and with hesitation	Able to respond and answer with minimum relevancy and confidence	Able to respond and answer clearly with some relevancy and confidence	Able to respond and answer clearly with significant relevancy and confidence	Able to respond and answer very well with high relevancy (with justification) and highly confidence
CO5: Perform oral presentation effectively about the research project in a well-organized and clear manner			PO10: Communication - Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;					
EA1: Range of Resources: Involve the use of diverse resources (people, money, information, technologies)								
EA3: Innovation: Creative use of engineering principles and research-based knowledge								
EA4: Consequences to society and environment: highlight significant consequences, characterized by difficulty of prediction & mitigation								
EA5: Familiarity of Issues: Extend beyond previous experiences using principle-based approaches								



RECOMMENDATION FORM: FACULTY PANEL 2 (ECC588)

STUDENT : _____ STUDENT ID: _____

RECOMMENDATION

Accepted with minor additional work

Additional work to be included:-

Accepted with major additional work

Additional work to be included:-

Accepted

Comments _____

Signature : _____ Date: _____

Supervisor's/Examiner's Name : _____