



Assessment Rubric for BS Senior Project

Department of Aeronautical Engineering

Academic Year:

Title of the Project:

Students Names:

Supervisors:

Preparation Phase for all Projects							
	Item Evaluated	4	3	2	1	Page #	Score
CLO 1 & CLO 2	Problem Definition	The problem to be solved is clearly stated. Objectives are complete, specific, and concise. Customer needs are correctly identified and transformed into project requirements. All potential customers are identified and their needs are taken into consideration.	The problem to be solved is described but there are minor omissions or vague details. Objectives are conceptually correct but may be incomplete, do not address the needs of all potential customers, or badly transformed into project requirements.	An attempt is made to identify the problem to be solved but it is described in a confusing manner, objectives are not relevant or contain technical/ conceptual errors and project requirements are vague or absent.	No mention is made of the problem to be solved.		
CLO 3	Literature Review	All pertaining information (including regulations, standards, and operational experiences) are identified and collected from a variety of credible sources. Information are reviewed and assessed with respect to their quality, validity and accuracy and presented using a standard and ethically referenced literature review format.	Pertaining information are identified and collected from a variety of credible sources. Information are assessed with respect to their quality, validity or accuracy to a limited extent or presented in a non standard format.	Collected information are limited, accessed from incredible or limited sources or presented without any attempt to assess their quality, validity or accuracy.	The students are unable to identify, access and/or present pertaining information in an acceptable format		
CLO 4,	Problem Formulation: Knowledge integration	The problem to be solved is logically formulated. Prior knowledge of mathematics, science and engineering principles as well as discipline related courses and collected information are successfully integrated to address the problem.	The problem to be solved is formulated but there are minor omissions or vague details. An attempt is made to use prior knowledge but it is either incomplete or contains some conceptual errors.	An attempt is made to formulate the problem but it is either confusing, or conceptually incorrect, with limited use of prior knowledge.	Knowledge integration is absent or completely erroneous		
CLO 5,	Problem Formulation: Realistic Constraints	All applicable realistic constraints (including economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability) are discussed with a clear strategy of how to deal with.	Most of applicable realistic constraints are discussed with a clear strategy to deal with only some of them	Major applicable realistic constraints are not presented, irrelevant, or conceptually incorrect.	Applicable realistic constraints are absent or completely erroneous		
CLO 6,	Problem Formulation: Objectives, Constraints & Evaluation Criteria	Objectives as well as constraints are design oriented, measurable and clearly presented. Evaluation criteria are quantitative, specific, and address customer needs.	Objectives, constraints and evaluation criteria are conceptually correct but some of them may be incomplete, vague or immeasurable.	Several objectives, several constraints and/or evaluation criteria are irrelevant or conceptually incorrect.	Objectives, constraints, or evaluation criteria are absent or completely erroneous		
CLO 7	Design Options and initial configuration	Several potential solutions are developed and compared to find the best baseline. Selection is based on quantitative and qualitative measures without violating any operational constraint.	Multiple solutions are developed and compared but one or two key aspects are neglected, only qualitative measures are used to compare alternatives, or some constraints are not considered	Multiple solutions are developed and compared but several key aspects are neglected, or the selection criteria is haphazard or based on subjective opinions and personal preferences	Design focuses on only one single solution to the problem.		
CLO 8	Work Plan	An effective design strategy is developed, including a plan of attack, decomposition of work into subtasks, balanced responsibilities of team members, an executable timetable and a justified project budget. Standard project planning techniques such as Gant charts, deployment charts, and critical path analysis are used.	An attempt is made to develop a workable design strategy but it is either incomplete, unclear, unbalanced, or does not follow standard project planning techniques.	Design strategy is inefficient and the work plan does not ensure project completion on time or within budget.	No design strategy is presented; a haphazard approach seems to be followed		



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Implementation Phase for Experimental Design Projects, if applicable :							
	Item Evaluated	4	3	2	1	Page #	Score
CLO 9.1	Experimental Variables and Parameters	Dependent and independent variables are identified as well as the range for both and the appropriate increments for measurements.	Dependent and independent variables are identified as well as the range for both of them	Dependent and independent variables are identified as well as the range of some of them	Dependent and independent variables are not correctly identified		
CLO 9.2	Experimental tools	A complete list of appropriate tools and instrumentation is present with complete justification. All details about how tools and instruments will be used are provided and clear (range and number of data points are optimized to capture full response within equipment limitations).	A complete list of appropriate tools and instrumentation is present with incomplete justification or with vague or incomplete details about how they will be used (range and appropriate number of data points to capture the phenomenon).	The list of appropriate tools and instrumentation is incomplete, the selection is not justified, or no details are given about how they will be used (range and appropriate number of data points to capture the phenomenon)	Failure to identify appropriate tools and instrumentation or some of the chosen measurements cannot be made with the available equipment.		
CLO 9.3	Experimental setup	The experiment solves the problem and has a high likelihood of producing data that will lead to a reliable solution.	The experiment attempts to solve the problem but due to the nature of the design there is a moderate chance the data will not lead to a reliable solution.	The experiment attempts to solve the problem but due to the nature of the design the data will not lead to a reliable solution.	The experiment does not solve the problem.		
CLO 9.4	Safety and environmental issues	Measures to deal responsibly with both safety issues and environmental hazards are presented	Measures presented deal responsibly with only one aspect: either safety issues or environmental hazards	Measures to deal with both safety and environmental hazards are vague, incomplete, or insufficient	No mention is made to safety or environmental issues related to the designed experiment		
CLO 9.5	Data Collection	All important data are ethically collected, organized, and clearly recorded.	All important data are present, but recorded in a way that requires some effort to comprehend.	Some important data are absent or incomprehensible.	Data are either absent, incomprehensible, or unethically collected.		
CLO 9.6	Data Analysis	The analysis is appropriate, complete, and correct. Appropriate tools such as data reduction techniques and statistical analysis are used	The analysis is appropriate but it contains minor errors or omissions.	An attempt is made to analyze data, but it is either seriously flawed or inappropriate.	No attempt is made to analyze the data.		
CLO 9.7	Uncertainty Analysis	All experimental uncertainties are correctly identified, evaluated and effective steps are taken to minimize them.	Most experimental uncertainties are correctly identified, evaluated and effective steps are taken to minimize them.	An attempt is made to identify experimental uncertainties, but most are missing, described vaguely, incorrectly evaluated, or ineffectively minimized	No attempt is made to identify, evaluate or minimize experimental uncertainties.		
CLO 9.8	Data Verification and Validation	An acceptable judgment is made about the result, with clear reasoning. Results are compared with theory and/or previous experimental work. The effects of assumptions and experimental uncertainties are considered.	An acceptable judgment is made about the result, but the reasoning is flawed or incomplete.	A judgment is made about the results, but it is not reasonable or coherent.	No discussion is presented about the results of the experiment		



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Implementation Phase for Product-Based Design Projects, if applicable:							
	Item Evaluated	4	3	2	1	Page #	Score
CLO 10.1	Design Parameters	Design parameters are correctly identified as well as their ranges based on acceptable arguments such as prior knowledge, data from existing similar products, theoretical modeling, and operational experience.	Major design parameters are correctly identified as well as their ranges based on acceptable arguments.	An attempt is made to identify design parameters but they are either irrelevant or based on unacceptable or conceptually incorrect arguments	Design parameters are not correctly identified		
CLO 10.2	Initial Design Calculations	Appropriate engineering resources and computer tools are efficiently used to carry on accurate design calculations of the initial configuration based on reasonably selected values of the design parameters.	Initial design calculations are conceptually correct but their accuracy is limited by simplifying assumptions, inaccurate modeling, hand calculations, or badly selected values of the design parameters.	Initial design calculations are conceptually correct but they may be partially incomplete, or containing numerical errors.	Initial design calculations contain major numerical or conceptual errors		
CLO 10.3	Performance of the Initial Design	Appropriate engineering resources and computer tools are efficiently used to carry on accurate performance calculations of the initial configuration.	Performance calculations are conceptually correct but their accuracy is limited by simplifying assumptions, inaccurate modeling, or hand calculations.	Performance calculations are conceptually correct but they may be partially incomplete, or containing numerical errors.	Performance calculations contain major numerical or conceptual errors		
CLO 10.4	Refinement of the Initial Design	Constraint analysis, trade-off studies of the design parameters, and practical measures of effectiveness are correctly used to refine the initial design and obtain a final optimized design	Constraint analysis, trade-off studies of the design parameters, and practical measures of effectiveness are used to refine the initial design with some minor errors or omissions.	An attempt is made to refine the initial design but it is either incomplete, conceptually incorrect or containing major errors.	Refinement process is absent or completely erroneous		
CLO 10.5	Impact of the Project	Project related environmental, social, health and safety issues as well as anticipated hazards are deeply evaluated. Local and global, long term as well as short term benefits and risks on users and non users are analyzed and how they might impact the general acceptance of the product and or might affect the future development of similar products.	Project related environmental, social, health and safety issues as well as anticipated hazards are evaluated with minor errors and omissions	An attempt is made to evaluate the impact of the project but it is either incomplete, superficial, or containing major conceptual errors	No impact statement is present		
CLO 10.6	Project Evaluation	Performance of the final design compares favorably to customer requirements, design criteria, operational constraints ,and existing products if any.	Performance of the final design fails to satisfy some requirements but deviations are analyzed and improvements are proposed.	Performance of the final design fails to satisfy some requirements. Deviations are analyzed but no improvements are proposed.	Final design is not evaluated		



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Student Evaluated:

Evaluated By:

Team Work Peer Evaluation						
	Item Evaluated	4	3	2	1	Score
CLO 11.1	Contribution to teamwork	Collects and presents to the team a great deal of relevant information; offers well-developed and clearly expressed ideas directly related to the purpose of the team	Collects basic, useful information related to the project; occasionally offers useful ideas to meet the team's needs.	Collects information when asked for; tries to offer some ideas, but not well developed, and not clearly expressed, to meet team's needs.	Does not collect any relevant information; no useful suggestions to address team's needs.	
CLO 11.2	Taking responsibility	Performs all tasks very effectively attends all meetings and participates enthusiastically and remains very reliable.	Performs all assigned tasks; attends meetings regularly and usually participates effectively; generally reliable.	Performs assigned tasks but needs many reminders; attends meetings regularly but generally does not say anything constructive; sometimes expects others to do his/her work.	Does not perform assigned tasks; often misses meetings and, when present, does not have anything constructive to say; relies on others to do the work.	
CLO 11.3	Valuing other team members	Always listens to others and their ideas; helps them develop their ideas while giving them full credit; always helps the team reach a fair decision.	Generally listens to others' points of view; always uses appropriate and respectful language; tries to make a definite effort to understand others' ideas.	Usually does much of the talking; does not pay much attention when others talk, and often assumes their ideas will not work; no personal attacks and put-downs but sometimes patronizing; when others get through to him, works reasonably well with them.	Often argues with team mates; doesn't let anyone else talk; occasional personal attacks and "put-downs"; wants to have things done his way and does not listen to alternate approaches.	



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Written Communication Skills						
	Item Evaluated	4	3	2	1	Score
CLO 12.1	Style & Formatting	The document is correctly formatted contains few, if any, typographical or grammatical errors, and perfectly meets specifications .	The document generally follows specifications and has few typographical or grammatical errors	The documents deviates from specifications and/or contains several errors	The document completely ignores specifications and is filled with errors	
CLO 12.2	Organization	The document provides a thorough and organized analysis that leads the reader through all technical issues clearly and succinctly. It contains an introduction that interests and orients the reader, a body that is relevant and covers the work done, and conclusions with recommendations, when appropriate	The document is reasonably well organized and there are some connections between sections.	The document has some organizational problems. Sections are essentially correct, but there is little transition or connection between them.	The document rambles with little organization. It is difficult to determine the key points.	
CLO 12.3	References	The document contains a standard, well formatted, and ethically prepared reference list.	The document is reasonably referenced with some minor omissions or formatting errors.	References are omitted, deviates from standard specifications and/or contain several errors.	The document is not ethical. Work from other sources is intentionally copied as if it is an authentic material	



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Oral Communication Skills						
	Item Evaluated	4	3	2	1	Score
CLO 12.4	Organization	Superb organization; builds on and provides support for the rest of the team's presentation; main points well stated and argued, with each leading to the next point of the talk.	Satisfactory organization; clear introduction; main points are well stated, even if some transitions are somewhat sudden; relation to the rest of the team's presentation clear.	Audience has difficulty following presentation because of some abrupt jumps; some of the main points are unclear or not sufficiently stressed;	Audience cannot understand presentation because of poor organization; introduction is undeveloped or irrelevant; relation to the rest of the team's presentation is unclear.	
CLO 12.5	Slides	Very creative slides; carefully thought out to bring out both the main points of this part of the presentation as well as the relation to the rest of the team presentation; maintains audience interest throughout.	Generally good set of slides; conveys the main points well;	Boring slides; no glaring mistakes but no real effort made into creating truly effective slides;	Slides seem to have been cut-and-pasted together haphazardly at the last minute; numerous mistakes; speaker not always sure what is coming next;	
CLO 12.6	Delivery	Natural, confident delivery that does not just convey the message but enhances it; excellent use of volume, pace etc.	Clear voice, generally effective delivery; minimal distracting gestures, etc., but somewhat monotone;	Low voice, occasionally inaudible; some distracting filler words and gestures; articulation mostly, but not always, clear;	Mumbles the words, audience members in the back can't hear anything; too many filler words; distracting gestures;	
CLO 12.7	Relating to audience	Keeps the audience engaged throughout the presentation; modifies material on-the-fly based on audience questions and comments; keenly aware of audience reactions.	Generally aware of the audience reactions; maintains good eye contact when speaking and when answering questions;	Occasional eye contact with audience but mostly reads the presentation; some awareness of at least a portion of the audience; only brief responses to audience questions;	Reads most of the presentation from the slides or notes with no eye contact with audience members; seems unaware of audience reactions;	
CLO 12.8	Contribution as a team member	Superb team player. Goes out of his way to help the rest of the team in any way he can to address audience questions, get over glitches during their presentations, etc., but doing all this as unobtrusively as possible.	Good team player. Is interested in the presentations by the other team members; makes a definite effort to ensure the success of the overall team presentation by occasionally helping the rest of the team respond to audience questions.	Mainly focused on his/her portion of the presentation; responds when another team member asks him/her a direct question but otherwise does not attempt to help other team members address audience questions.	Seems to have no interest in the presentations by the other members of the team; occasionally gets into arguments with the other members.	

Marking Scheme for Senior Projects in AE Department

A rule of 50 - 50 is applied
(50% for the supervisor and 50% for the external evaluators)

The final grade is composed of: 30% course work, 45% Final Report, 15% Oral Presentation, and 10% Team Work

Course work: a grade out of 30 is given by the supervisor as an assessment of the student's interaction, punctuality, participation, contribution to the team and technical competence as demonstrated over the two semesters of project work.

Final Report: The final report is normally evaluated by 3 evaluators (the supervisor plus two external evaluators). A grade out of 45 is given to three elements of the final report which are assessed using 3 rubrics:

- Preparation Phase Rubric (a total of 15%, i.e. 5 marks from each evaluator).
- Implementation Phase Rubric (a total of 15%, i.e. 5 marks from each evaluator).
- Written Communication Skills Rubric (a total of 15%, i.e. 5 marks from each evaluator).

Final Oral Presentation: A final, general audience, oral presentation and examination (of 60 minutes) is evaluated by the same 3 evaluators who evaluated the final report. The Oral Communication Skills is used. A grade out of 15 is given (i.e. 5 marks from each evaluator)

Team Working: Team working skills are peer-evaluated by the team members. The Team Work Peer evaluation Rubric is used where each team member evaluates the other team members. A grade out of 10 is given to each team member representing the average of the score given to him by the other team members.