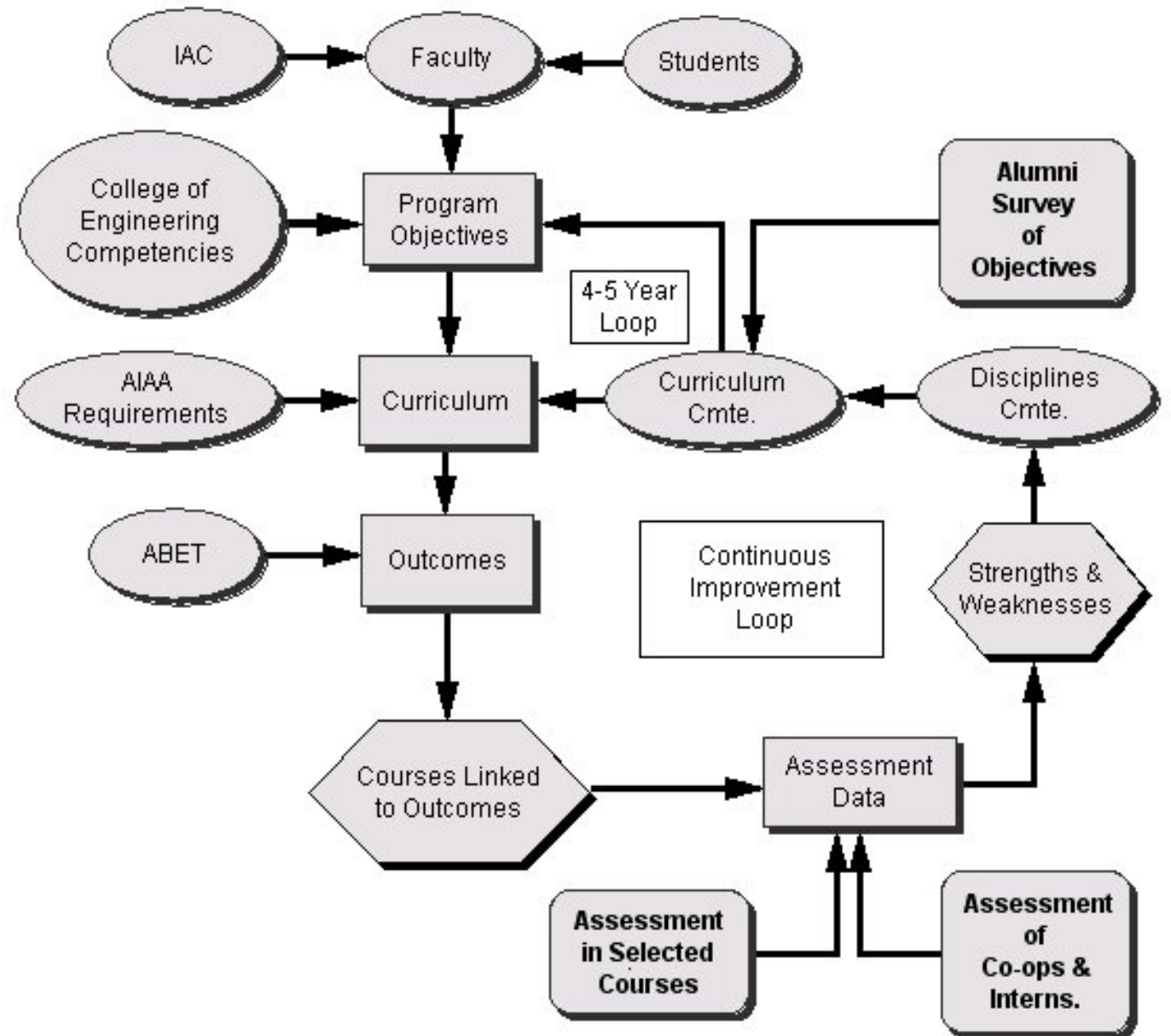


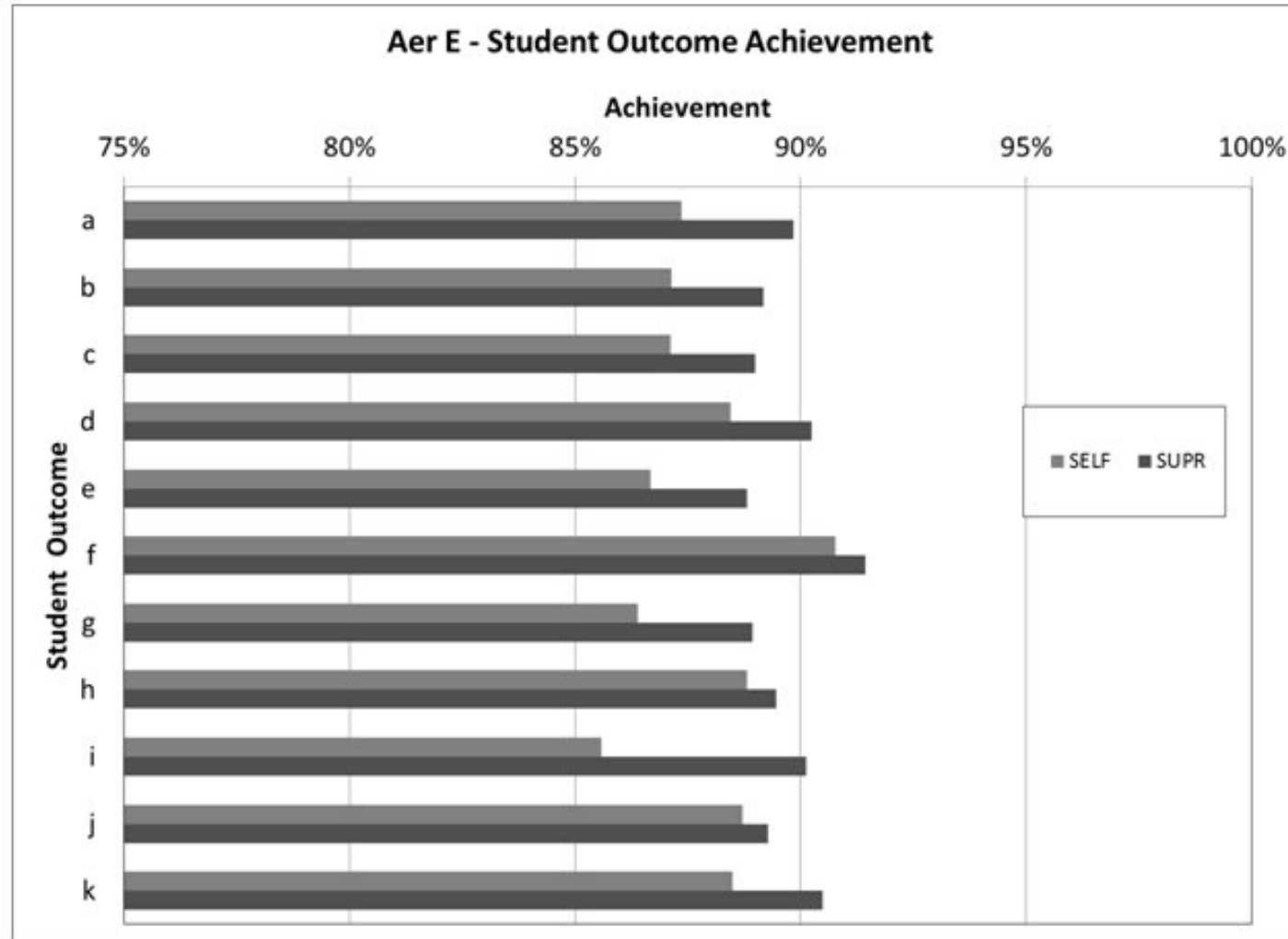
# Assessment Plan

BS – Aerospace Engineering Program



# Student Outcome Achievement

- Assessed by supervisors of Co-ops and Internships



# Assessment in Selected Courses

Course	a	b	c	d	e	f	g	h	i	j	k
AerE160	H	R	H	M	H	M	H	M	M	M	R
AerE161	H	H	R	M	H	M	H(A)	M	M	M	R
AerE261	H	R		R	H	R	R(A)	R	R	R	H
AerE361	H	H	H		H		H(A)				H(A)
AerE461	H		H	H	H	H(A)					H
AerE462	H	H	H(A)	H(A)	H(A)	H	H	H	H(A)	R	H
AerE321	H(A)				H				R		R
AerE321L	H	H(A)					R				H
AerE421	H				H				R		H
AerE311	H		R		R	M	M		M		R
AerE243	H(A)	M	M	M	R	M	M	M	M	M	R
AerE344	R	H(A)	R	R	M	M	R	M	M	M	R
AerE411	H	R	M		R			M	M	M	R
AerE331	H(A)	R	H	M	H	R	R	M	R	M	H
AerE351	H(A)	M	R	R	H	M	M	M	R	M	H
AerE355	H(A)	R	R	M	R	M	R	M	R	M	H
Gen.Ed.								(X)		(X)	

Highly Relevant	H
Relevant	R
Marginally Relevant	M

# a) An ability to apply knowledge of mathematics, science, and engineering

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Deficient -1	Score
Identify relevant mathematical, physical, or systems principles	All relevant principles and theorems identified	Sufficient relevant principles and theorems identified but 1-2 minor ones missing	Some relevant principles and theorems identified but at least 1-2 important ones missing	Most of the relevant principles and theorems are missing	3
Formulate problems based upon applicable principles or theorems as mathematical (or experimental) problems	Strong ability	Sufficient ability	Some ability	No significant ability	3
Select an effective method to solve the problem	Strong ability	Sufficient ability	Some ability	No significant ability	3.4
Perform necessary calculations to solve the problem	Strong ability	Sufficient ability	Some ability	No significant ability	3.5
Analyze the results	Strong ability	Sufficient ability	Some ability	No significant ability	3.3

## b) An ability to design and conduct experiments, as well as to analyze and interpret data

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Decadent -1	Score
Able to formulate an engineering problem in terms of fundamental principles that can be evaluated experimentally	Strong knowledge	Sufficient ability	Some ability	No significant ability	3.5
Able to design an experiment to obtain data in support of an engineering problem	Strong knowledge	Sufficient ability	Some ability	No significant ability	3.3
Knowledge of equipment, sensors, instrumentation, and data acquisition methods	Strong knowledge	Sufficient ability	Some ability	No significant ability	3.5
Knowledge of data analysis including statistics, error analysis, and software	Strong knowledge	Sufficient ability	Some ability	No significant ability	2.75
Able to interpret data and draw reasonable conclusions	Strong knowledge	Sufficient ability	Some ability	No significant ability	3

# c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Deficient -1	Score
Ability to identify project objectives based on project/client requirements	All important objectives identified	Important objectives identified but some minor ones missing	Most objectives identified and some important ones missing	Most or all important objectives are not identified	3.7
Perform necessary technical analysis to support design solution	Appropriate analysis performed; correct conclusions made	Satisfactory analysis and conclusions	Analysis and conclusions contain several significant errors	Analysis and conclusions seriously flawed or nonexistent	3.8
Ability to make intelligent trade-offs with respect to performance, cost, schedule, manufacturability, etc	Excellent ability	Sufficient ability	Some ability	No significant ability	4
Ability to select design solution based on project needs, technical and economic criteria and considering relevant constraints	Best solution determined based on stated criteria and constraints	Reasonable solution obtained; alternatives should have been developed and analyzed	Satisfactory solution obtained; alternatives were not considered	Unsatisfactory solution obtained; most criteria and constraints ignored	3.75

## d) An ability to function on multi-disciplinary teams

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Deficient -1	Score
Team -Function	Mutual understanding of goals, highly effective task assignment based on expertise, excellent coordination	Mutual understanding of goals, reasonable task assignment, good coordination	Some communication problems, non-ideal task assignment; problems with coordination	Lack of communication, organization and/or coordination; ineffective task assignment	3.95
Individual -Contributes to team project, work	Collects and presents relevant information; offers well-developed and clearly expressed ideas relevant to objectives	Collects basic, useful information related to project; occasionally offers useful ideas	Collects information when prodded; tries to offer some ideas, but not well developed, and not clearly expressed	Does not collect relevant information; no useful suggestions	3.95
Individual -Takes Responsibility	Performs all tasks effectively; attends all meetings and participates enthusiastically; very reliable	Performs all assigned tasks; attends meetings regularly and usually participates effectively; generally reliable	Performs assigned tasks but needs reminders; attends meetings regularly but generally does not participate; sometimes expects others to do his/her work	Does not perform assigned tasks; misses meetings, does not say anything constructive; relies on others to do work	3.95
Individual -Values other team members	Always listens to others and their ideas; helps them develop their ideas while giving them full credit; always helps team reach a fair decision	Generally listens to others' points of view; uses appropriate and respectful language; makes effort to understand others' ideas;	Much talking; does not pay much attention; often assumes ideas will not work; sometimes patronizing	Often argues with teammates; doesn't let anyone else talk; occasional personal attacks and "putdowns"; wants to have things done his way and does not listen to alternate approaches;	3.95

# e) An ability to identify, formulate, and solve engineering problems

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Deficient -1	Score
Identify an opportunity to scientifically solve problems	Strong ability	Sufficient ability	Some ability	No significant ability	3.8
Identify and list basic physical or systems principles and/or theorems necessary for problem formulation	Strong ability	Sufficient ability	Some ability	No significant ability	3.9
Preliminary formulation of the problem with appropriate abstraction	Strong ability	Sufficient ability	Some ability	No significant ability	3.9
Collection of further information and data collection that justify the above model or abstraction	Strong ability	Sufficient ability	Some ability	No significant ability	3.8
Assemble necessary components for the implementation of the solution methodology and design the implementation	Strong ability	Sufficient ability	Some ability	No significant ability	3.8
Solution development or experimentation	Strong ability	Sufficient ability	Some ability	No significant ability	3.6
Interpretation of results and appraise the accuracy of the model	Strong ability	Sufficient ability	Some ability	No significant ability	3.5
Documentation including recommendations for further research	Strong ability	Sufficient ability	Some ability	No significant ability	3.6



## f) An understanding of professional and ethical responsibility

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Deficient -1	Score
Demonstrates knowledge of professional code of ethics	Comprehensive knowledge	Sufficient knowledge	Some knowledge	No knowledge	3.5
Ability to evaluate the ethical dimensions of a problem in the discipline	Strong knowledge	Sufficient ability	Some ability	No significant ability	3.5
Acknowledgement of sources	Always acknowledges and documents information source or assistance of others	Generally acknowledges information source or assistance of others	Does not always acknowledge information source or assistance of others	Evidence of plagiarism, takes credit for work of others	3.5
Treatment of peers, instructors, staff, industry sponsors	Always professional	Generally professional	Sometimes unprofessional	Consistently unprofessional	4

## g) An ability to communicate effectively (Written)

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Deficient -1	Score
Written -Format, Presentation	Organization enhances readability; Clear understanding and statement of objectives; Clear, focused, complete discussion; conclusions provide insight on topic	Logical organization; Understanding and statement of objectives; Clear discussion; convincing conclusions but lacks in-depth understanding;	Standard organization; Objectives copied from class statement; Somewhat unclear and/or incomplete discussion; some plausible conclusions;	Disorganized; Objectives unclear; Unclear and incomplete and/or bland discussion; no clear conclusions;	3.2
Written -Content, Analysis, Evaluation	Comprehensive with quality information; Detailed and correct analysis accounting for all information; conclusions extremely well supported	All required information included; Careful analysis; good supporting evidence for conclusions	Some information missing; Some analysis done but somewhat shallow and/or some incorrect analysis; some supporting evidence	Incomplete information; Analysis simply involves restating gathered information and/or incorrect analysis; claims not supported by evidence	3.3
Written -Mechanics	Compelling writing style; Clarity of text, table, figures, etc. enhances report impact; Correct grammar, punctuation, spelling	Good style; Text, tables, figures, etc. are readable and easy to understand; Very few errors in grammar, punctuation, spelling	Words and sentences are adequate but lack energy; Some portions sloppy and difficult to comprehend; Some errors in grammar, punctuation, spelling	Occasional problems with words and sentences leading to unclear meaning; Unacceptable, tables and figures not readable or understood; Many errors in grammar, punctuation, spelling	3

## g) An ability to communicate effectively (Oral)

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Deficient -1	Score
Oral -Format	Organization enhances understanding; clear introduction; main points well stated and argued, with each leading to next; clear summary and conclusion	Logical organization; introduction; main points well stated, even if some rough transitions; clear conclusion	Weak organization causing difficulty to follow talk; some main points are unclear or not sufficiently stressed	Poor organization; introduction is undeveloped or irrelevant; main points and conclusion unclear	3.5
Knowledge	Comprehensive coverage for talk; Command of subject; answers all questions with explanations and elaboration	Sufficient knowledge; responds to expected questions but fails to elaborate	Uncomfortable with some information; able to answer only rudimentary questions	Does not have grasp of knowledge; cannot answer questions about subject	3.5
Oral -Mechanics	Effective, creative slides; Clear, confident talk conveys and enhances message; excellent use of volume, pace; Keeps audience engaged, good interaction	Generally good slides; conveys main points well; Clear voice, generally effective; Connection with audience	Uninteresting slides; no major mistakes; Low, sometimes in audible or unclear voice; Some awareness of audience	Unclear slides; created haphazardly, last minute; numerous mistakes Inaudible or unclear voice; Unaware of audience, no connection	3.5

h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

- In order that the students achieve a broad education so that they understand the impact of their work in a global and societal context; they are allowed to take a variety of general education courses. They select courses based on their interest. They are free to seek advice from the department advisors and faculty.

# i) A recognition of the need for and an ability to engage in life-long learning

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Deficient -1	Score
Able to use library resources	Strong knowledge and use of library online databases, references and search methods	Sufficient ability to utilize library resources and on-line databases	Some ability to utilize library resources and on-line databases	No significant ability to utilize library resources and on-line databases	3.6
Gather relevant technical/scientific information	All relevant information from the library, vendors, and appropriate databases is obtained	Sufficient information is obtained	Some information is obtained	No significant information is gathered	3.8
Able to write a project proposal	Proposal has comprehensive review of at least 5 recent journal articles/books on a topical subject; effectively frames project goals into current state-of-the-art or technology	Sufficient ability to write proposal	Some ability to write proposal	No significant ability to write proposal	3.2
Knowledge of student engineering and professional organizations and journals	Active member of student engineering organization, utilizes professional journals	Member of student engineering organization, references professional journals	Knowledge of engineering organizations and journals	No significant knowledge of student engineering organizations and journals	3

## j) A knowledge of contemporary issues

- Knowledge of contemporary issues depends very much on the interest and context. Hence the students are allowed to choose their area of study. They are free to seek advice from the department advisors and faculty.

# k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Performance Criteria	Exemplary -4	Proficient -3	Apprentice -2	Deficient -1	Score
Able to write a computer program using compiler programming language (e.g., C/C++, Fortran90) to solve engineering problem	Strong knowledge	Sufficient ability	Some ability	No significant ability	4
Able to develop a numerical algorithm to solve engineering problem	Strong knowledge	Sufficient ability	Some ability	No significant ability	4
Able to use computer software, e.g. MATLAB, Pro-E, Lab-View, TechPlot	Strong knowledge	Sufficient ability	Some ability	No significant ability	4