Auburn University
Department of Polymer and Fiber Engineering

Student Performance Criteria

June 2, 2009

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

LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)			
	5	**3**	**1**
Model development	Combines mathematical and/or scientific principles to formulate models	Chooses model from menu but has trouble developing model that represents chemical or physical processes	Does not understand connection between models and chemical or physical processes
Advanced mathematical concepts	Applies calculus to solve problems	Basic understanding of the application of calculus	Does not understand application of calculus to solving engineering problems
Interpretation	Interprets mathematical and scientific terms and concepts correctly	Interprets some mathematical and scientific terms and concepts correctly	Mathematical and scientific terms and concepts are interpreted incorrectly
Theory to practice	Translates theory into engineering applications and understands limitations of mathematical models	Some gaps in understanding of application of theory	Does not grasp connection between theory and practice
Calculations	Executes calculations correctly	Minor errors in calculations	Calculations not performed correctly
Statistical analysis	Correctly analyzes data using statistical concepts.	Minor errors in statistical analysis	Incorrect application of statistical concepts

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

LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)			
	5	**3**	**1**
Lab safety	Observes good laboratory safety procedures	Unsafe procedures observed infrequently	Unsafe lab procedures followed
Planning to meet objectives	Formulates appropriate experimental plan to attain a stated objective	Simplistic experimental plan, does not recognize scope	No systematic plan
Selection of procedures	Selects appropriate procedures and equipment to perform experiments	Needs some guidance in selecting appropriate procedures and equipment	Cannot select appropriate procedures or equipment
Interpretation and analysis	Analyzes and interprets data using appropriate concepts; aware of measurement error and accounts for it	Some data are misunderstood or misinterpreted; Aware of measurement error but does not account for it	No attempt to relate data to theory or experiments; unaware of measurement error
Documentation	Correctly documents data	Not all data documented correctly	Data poorly or incorrectly documented

c. An ability to design a system, component, or process to meet desired needs

	LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)		
	5	**3**	**1**
Understanding and establishing relationships between the need and design	Has a complete understanding between function and design	Needs outside help to make connection between the need and design	No understanding and no connection between the need and design
Creativity in solving design problems	Develops novel design ideas	Needs help to develop new design ideas	Has no design creativity
Manufacturing and assembling the entire system to function properly	Knows how to fit every component together for proper functioning	Understands the system but unable to fit the system components together	Unable to integrate the system components
Testing of final product	Conducts proper functionality tests correctly with meaningful results	Can test the product partially	Can not test the product

d. An ability to function on multi-disciplinary teams

	LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)		
	5	**3**	**1**
Fulfilling team role's duties	Performs all assigned duties of team role without much supervision	Performs some duties assigned	Does not perform any duties of assigned team role
Mutual respect for ideas of fellow team members	Respects and values the ideas of other team members	Selectively respects and values ideas of other team members	Does not respect or value other ideas of the team; criticizes frequently
Communication with other teammates	Listens carefully and speaks a fair amount as needed	Usually doing most of the talking; rarely listens and allows others to speak	Is always talking; never allows anyone else to speak; does not listen

e. An ability to identify, formulate, and solve engineering problems

LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)			
	5	**3**	**1**
Identification and understanding of the problem	Properly identifies and understands the problem or issue	Can identify and grasp some of the problem or issue	Does not grasp the scope of the problem or issue
Analysis and formulation of the problem	Able to analyze and formulate the entire problem	Analyzes and formulates only portions of the problem but not all	Unable to analyze and formulate the problem
Synthesis and solution of the problem	Able to fit the pieces together to solve the problem	Only able to solve portion(s) of the problem	Can not add the pieces together to reach a solution

f. An understanding of professional and ethical responsibility

LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)			
	5	**3**	**1**
Understanding the importance of ethical responsibility	Assigns utmost importance to ethical behavior	Some consideration of ethical issues	Does not consider that ethical behavior is important
Giving credits to others for the use of their materials	Always gives credits to others for any use of their intellectual property (IP)	Sometime gives credit to others for their IP	Does not recognize other people's work and copies their IP freely
Professional responsibility	Demonstrates responsible behavior and takes initiatives to help others or make suggestions	Demonstrates responsible behavior only when asked	Does not think that he/she has any professional responsibility to others and society at large
Student code of ethics	Aware of the student code of ethics and abides by it	Aware of the student code of ethics but does not abide by it all the time	Violates the student code of ethics freely

g. An ability to communicate effectively

	LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)		
	5	**3**	**1**
Written communication	Writes effectively and appropriately for various audiences and purposes	Able to express ideas in writing but not very effectively for different audiences and purposes	Not able to write effectively for different audiences and purposes
Oral communication	Makes oral presentations effectively and appropriately for various audiences and purposes using good time management	Able to present information orally, but not able to explain and interpret results or respond to questions for various audiences and purposes	Not able to present, explain and interpret information for various audiences and purposes; not able to respond to questions
Visual communication	Uses visual aids effectively to explain, interpret, and assess information	Able to make some use of visual aids to explain, interpret and assess information but not very effectively	Not able to use visual aids effectively to explain, interpret, and assess information

h. A broad education necessary to understand the impact of engineering solutions in a global and societal context

	LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)		
	5	**3**	**1**
Understanding the impact of engineering solutions in a global context	Evaluates tradeoffs of global issues to make informed decisions about engineering solutions	Has some ability to evaluate tradeoffs to make informed decisions about engineering solutions	Not able to evaluate tradeoffs of global issues
Understanding the impact of engineering solutions in a societal context	Critically evaluates engineering solutions from a societal perspective and make informed decisions	Has some ability to evaluate engineering solutions from a societal perspective	Not able to evaluate engineering solutions as they impact the society

i. A recognition of the need for, and ability to engage in life-long learning

	LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)		
	5	**3**	**1**
Learning skills	Develops necessary/new learning skills	Develops some learning skills	Not able to develop/use learning skills
Learning needs	Able to identify relevant needs and learns them	To some extent, knows what issues are relevant to be learned	Does not know what needs to be learned
Learning plan	Able to make, evaluate and follow a learning plan	Able to make a learning plan but not follow it thoroughly	Not able to make a learning plan

j: A knowledge of contemporary issues

	LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)		
	5	**3**	**1**
Current issues relevant to the profession of engineering	Understands and articulates current engineering issues	Understands current engineering issues but can not articulate them	Not able to understand current issues relevant to engineering

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

	LEVEL OF ABILITY (5: Exemplary, 3: Needs improvement, 1: Unsatisfactory)		
	5	**3**	**1**
Use of modern engineering techniques, skills and tools	Makes informed decisions based on utilization of techniques, skills and modern engineering tools	Makes informed decisions on some issues using techniques, skills and some modern engineering tools	Not able to make informed decisions using techniques, skills and engineering tools