BMEG 311 - Biomaterials

Student Outcome 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 Criterion #1: *Students can select biomaterials for a given biomedical application including immune response, mechanical properties, and degradation mechanisms*

Scoring Rubric:

Aspect	1: Not proficient	2: Progressing to proficiency	3: Proficient	4: Superior proficiency
Student can determine an optimum biomaterial for an application based on constraints such as the immune response, mechanical properties and degradation requirement.	No identification of the types of immune response, mechanical properties and degradation needed for the application	Incorrect identification of the types of immune response, mechanical properties and degradation needed for the application, but types are given	Correct identification of the types of immune response, mechanical properties and degradation needed for the application	Correct identification of the types of immune response, mechanical properties and degradation needed for the application with explanation why they are optimum

Performance Criterion #2: *Students can utilize biomaterial properties (biological and chemical) to design novel biomedical devices or enhance devices currently implemented*

Scoring Rubric:

Aspect	1: Not proficient	2: Progressing to proficiency	3: Proficient	4: Superior proficiency
Student can determine the pertinent properties of a biomaterial for its use in a	Properties are not given	List of properties is limited (no more than 2 items) or has incorrect	List of properties has more than three items and they are correct, with	List of properties is given, correct, and enhanced by explanation of the impact

specific biomedical device.		items, and no relationship to device purpose given.	relationship to device purpose given.	on the device.

Student Outcome g: an ability to communicate effectively.

Performance Criterion #1: *Students will effectively communicate their design of a biomedical device.*

Scoring Rubric:

Aspect	1: Not proficient	2: Progressing to proficiency	3: Proficient	4: Superior proficiency
Presentation is clear and readable	not clear or readable, fonts unreadable	no more than 2 items difficult to read; several VAs have smaller than desired font	clear and readable; most fonts readable	superior clarity and readability; font readable
Slides have appropriate amount of information	so much information per VA or so much missing information to make VAs useless	no more than 2 VAs with too much or too little information, inconsistent with what is spoken	appropriate level of information per VA, not always consistent with what is spoken	appropriate level of information per VA, consistent with what is spoken
Topics are given in a logical order	totally disjointed, no organization	multiple items presented out of order	no more than 2 items presented out of order	organization logical and as per guidelines
Complete "story" told through presentation	story missing, no story told	story incomplete	complete story told	complete story enhanced with related extra information
Maintain quality of	difficult to understand,	generally competent	voice clearly heard, words	voice projected very well, clear

speech during presentation	voice consistently hard to hear, voice trails off often, spoke too slow or too fast, overuse of slang and/or jargon, presentation full of hesitations, ums, ahs, etc.	delivery with fewer than 2 instances of voice hard to hear, voice trailing off, speaking too fast, use of slang and/or jargon, some ums, ahs, etc.	clearly enunciated, did not speak too slowly or too rapidly clear, continuous presentation, perhaps a few ums, ahs, etc.	enunciation, did not speak too slowly or rapidly superior presentation, free of ums, ahs, etc.
Composure maintained during presentation	clearly unsure, nervous, confused	perhaps nervous at start, but composure gained as presentation progresses	composed at all times	exudes/conveys confidence

Performance Criterion #2: *Students can prepare and deliver technical written reports*

Scoring Rubric:

Aspect	1: Not proficient	2: Progressing to proficiency	3: Proficient	4: Superior proficiency
Organization	inappropriate content in most sections of report	no more than 2 instances of content in inappropriate section of report	content appropriate to all sections of report	organization enhances readability of the report while still following guidelines
Formatting	text, tables and figures are difficult to interpret and/or read; multiple format errors that make the report difficult to read	portions are sloppy and difficult to read; no more than 2 format errors	text, tables, figures readable; format followed	text, tables, figures readable and clearly understandable; format aspects enhance report impact

Complete Story Told in document	important aspects of story missing	minor aspects of story are not included	complete story told	additional material enhances quality of report
Results and Analysis are presented clearly	text, tables and figures are difficult to interpret and/or read	portions are sloppy and difficult to read	text, tables, figures readable	text, tables, figures readable and clearly understandable

Student Outcome i: a recognition of the need for, and an ability to engage in life-long learning

Performance Criterion #1: *Students can perform independent evaluation and research on a biomedical engineering device.*

Scoring Rubric:

Aspect	1: Not proficient	2: Progressing to proficiency	3: Proficient	4: Superior proficiency
perform a literature search on a biomedical devices based on a current event article	No literature search performed, or device not designed in the last 10 years	Literature search was based only on current event article with no additional investigation	Literature search contained sources beyond the current event article, but over 75% were websites, not journal articles	Literature search contained peer reviewed sources beyond the current event article.
evaluate an FDA-approved device including background and rationale for the device design (materials, parts, processing)	no evaluation attempted, only report on FDA approval documentation	evaluation given only covers background for the device design	evaluation includes information about why the device was designed and in depth discussion of parts,	evaluation covers device background and design completely

			materials or processing	

Student Outcome j: a knowledge of contemporary issues.

Performance Criterion #1: *Students can identify and elaborate on current biomedical engineering topics*

Scoring Rubric:

Aspect	1: Not proficient	2: Progressing to proficiency	3: Proficient	4: Superior proficiency
evaluate the significance of a new or potential biomedical device	no evaluation attempted	evaluation performed is on the device, not its significance	explanation given with the impact of device implementation mentioned	detailed explanation about the impact of device implementation
perform a literature search on a biomedical devices based on a current event article	No literature search performed, or device not designed in the last 10 years	Literature search was based only on current event article with no additional investigation	Literature search contained sources beyond the current event article, but over 75% were websites, not journal articles	Literature search contained peer reviewed sources beyond the current event article.