

**ROY G. PERRY COLLEGE OF ENGINEERING
MECHANICAL ENGINEERING DEPARTMENT
PRAIRIE VIEW A&M UNIVERSITY**

ASSESSMENT REPORT COVER PAGE

**MCEG 3303 MANUFACTURING PROCESSES
Y01**

SPRING 2022

**NAME OF INSTRUCTOR
Dr. Lai Jiang**

05/20/2022

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To apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. (Outcome – 4).

Sample Assignment: Comprehensive Report on a Family of Manufacturing Processes (Course Project)

Detailed Course Syllabus
(Distributed to Students at the beginning of the Semester)
ABET Outcomes measured using course should be
Explicitly listed in the syllabus

Prairie View A&M University
Department of Mechanical Engineering
MCEG 3303 - Y01 Manufacturing Processes
Spring 2022

COURSE CONTENTS	This course provides the concepts for the conversion of materials into products. It includes measurements and quality assurance, and processes of casting, forming, materials removal, and joining. In addition, it involves the study of Computer Numerical Control (CNC) machines, manufacturing systems, automation, and additive manufacturing.
COURSE NO.	MCEG 3303
CREDIT	3 credit hours
SECTION	Y01
PRE-REQUISITES	MCEG 2303 Materials Science and Engineering (used to be MCEG 2023)
CO-REQUISITES	MCEG 3103 Manufacturing Processes Lab (used to be MCEG 3031)
CLASS HOURS	TR 11:00 am – 12:20 pm
CLASSROOM	New Electrical Engr. Bldg. 119
INSTRUCTOR	Dr. Lai Jiang
OFFICE	C. L. Wilson Engr. Bldg., 105A
OFFICE HOURS	T: 9:30 – 11:00 am, 3:00 – 4:30 pm (virtual); W: 11:00 am – 12:00 pm, 2:00 – 4:00 pm
TELEPHONE	936-261-9927
E-MAIL	lajiang@pvamu.edu Student emails will be replied within one business day during weekdays and by the following Monday during weekends.
TEXTBOOK	Groover, Mikell P., Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, (6 th edition), John Wiley & Sons Inc., New York, NY. ISBN: 978-1119128694
OUTCOMES	After completion of this course, the students are expected to: 1. Apply knowledge of different skills and techniques in the manufacturing of engineering components; 2. Analyze operational procedures required to manufacture a part; 3. Use manufacturing literature and consult databases.

GRADING	The final grade will be computed according to the following weight distribution: <table><tr><td>Homework</td><td>10%</td></tr><tr><td>Quizzes</td><td>15%</td></tr><tr><td>Project</td><td>20%</td></tr><tr><td>Midterm exam</td><td>25%</td></tr><tr><td>Final exam</td><td>30%</td></tr><tr><td>Total</td><td>100%</td></tr></table>	Homework	10%	Quizzes	15%	Project	20%	Midterm exam	25%	Final exam	30%	Total	100%
	Homework	10%											
Quizzes	15%												
Project	20%												
Midterm exam	25%												
Final exam	30%												
Total	100%												
	Grading results for assignments such as homework, quizzes, and exams will be available to students within one week of the due date. The grading for the final report of the course project will be available after the semester ends. The distribution of grades will be as follows: <table><tr><td>A = 90 – 100</td></tr><tr><td>B = 80 – 89</td></tr><tr><td>C = 70 – 79</td></tr><tr><td>D = 60 – 69</td></tr><tr><td>F = 0 – 59</td></tr></table>	A = 90 – 100	B = 80 – 89	C = 70 – 79	D = 60 – 69	F = 0 – 59							
A = 90 – 100													
B = 80 – 89													
C = 70 – 79													
D = 60 – 69													
F = 0 – 59													
COURSE POLICY	Note: The instructor reserves the right to alter this syllabus during this semester. Use of eCourses, PVAMU email, and Taskstream All class-related materials will be posted on <u>eCourses</u>. Important announcements such as quiz and exam time and homework may be sent out through your registered <u>PVAMU email</u>. Students are responsible for checking their PVAMU email daily to get such information. The course project final report needs to be submitted via <u>Taskstream</u>. Academic Integrity Academic dishonesty of any sort (plagiarism, cheating, fabrication or facilitation) is prohibited under any circumstance. Any detected actions of dishonesty will cause the failure of the class directly. Assignment & Due Dates Homework is due at midnight of the due date. Late homework will be charged a 20% penalty for each additional day late – weekend days do count. Examinations and Quizzes No makeup test or quiz will be given except for documented emergencies.												

Tentative Course Schedule

WEEK NO.	CONTENTS	CHAPTER
Week 1 (1/18, 1/20)	Course Introduction, Introduction to Manufacturing Processes	1
Week 2 (1/25, 1/27)	Mechanical Properties of Materials	3
Week 3 (2/1)	Dimensions, Surfaces, and their Measurement	5
Weeks 3-4 (2/3, 2/8)	Metal Machining	20
Weeks 4-5 (2/10, 2/15)	Machining Operations and Machine Tools	21
Weeks 5 (2/17)	Cutting-tool Technology	22
Week 6 (2/22, 2/24)	Metal Casting and its Processes	10, 11
Week 7 (3/1, 3/3)	NC Codes for CNC Milling	
Week 8 (3/8, 3/10)	Midterm Exam Project Assignment	
Week 9 (3/15, 3/17)	Spring break, no class	
Weeks 10-11 (3/22, 3/24, 3/29)	Shaping Processes for Plastics	13
Weeks 11-12 (3/31, 4/5)	Rapid Prototyping	32
Weeks 12-13 (4/7, 4/12, 4/14)	Bulk Deformation Processes in Metal Working	18
Week 14 (4/19, 4/21)	Sheet Metalworking	19
Week 15 (4/26, 4/28)	Final Exam Review	
Week 16 (5/3)	Final Exam	

How Mechanical Engineering Courses meet Department Objectives & ABET Criterion 3

Specific objectives of the Mechanical Engineering Program are to produce graduates who will:

1. have the necessary knowledge and skills to enable them to have successful careers in mechanical engineering and related fields;
2. have the leadership skills to advance their careers through increasing levels of responsibilities and leadership;
3. have the necessary educational background to successfully pursue graduate or advanced professional degrees and continuing professional development, and
4. actively participate in professional and community services.

ABET Criterion 3: Program Outcomes and Assessment

Engineering Programs must demonstrate that their graduates have:

- (a) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- (b) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- (c) an ability to communicate effectively with a range of audiences.
- (d) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- (e) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- (f) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- (g) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

MCEG 3033 Course Objectives and Anticipated Outcomes

Course Objectives

1. Introduce students with major manufacturing processes of engineering materials.
ABET Anticipated Outcomes 4: The students will be able to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
2. Introduce the students on how to use modern manufacturing processes to accomplish mechanical system design and manufacturing tasks.
ABET Anticipated Outcomes 2: The students will be able to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

Student Support and Success

John B. Coleman Library

The John B. Coleman Library's mission is to enhance the scholarly pursuit of knowledge, to foster intellectual curiosity, and to promote life-long learning and research through our innovative services, resources, and cultural programs, which support the Prairie View A&M University's global mission of teaching, service, and research. It maintains library collections and access both on campus, online, and through local agreements to further the educational goals of students and faculty. Website: <https://www.pvamu.edu/library/>; Phone: 936-261-1500

Academic Advising Services

Academic Advising Services offers students a variety of services that contributes to student success and leads towards graduation. We assist students with understanding university policies and procedures that affect academic progress. We support the early alert program to help students get connected to success early in the semester. We help refer students to the appropriate academic support services when they are unsure of the best resource for their needs. Faculty advisors support some students in their respective colleges. Your faculty advisor can be identified in PantherTracks. Advisors with Academic Advising Services are available to all students. We are located across campus. Find your advisor's location by academic major at www.pvamu.edu/advising. Phone: 936-261-5911

The University Tutoring Center

The University Tutoring Center (UTC) offers free tutoring and academic support to all registered PVAMU students. The mission of the UTC is to help provide a solid academic foundation that enables students to become confident, capable, independent learners. Competent and caring staff and peer tutors guide students in identifying, acquiring, and enhancing the knowledge, skills, and attitudes needed to reach their desired goals. Tutoring and academic support are offered face-to-face in the UTC, in virtual face-to-face sessions (<https://www.pvamu.edu/student-success/sass/university-tutoring-center/>), and through online sessions (<https://www.pvamu.edu/pvplace/>). Other support services available for students include Supplemental Instruction, Study Break, Academic Success Workshops, and Algebra Study Jam. Location: J. B. Coleman Library, Rm. 307; Phone: 936-261-1561; Email: pv tutoring@pvamu.edu; Website: <https://www.pvamu.edu/student-success/sass/university-tutoring-center/>

Writing Center

The Writing Center provides well-trained peer tutors to assist students with writing assignments at any stage of the writing process. Tutors help students with various writing tasks from understanding assignments, brainstorming, drafting, revising, editing, researching, and integrating sources. Students have free access to Grammarly online writing assistance. Grammarly is an automated proofreading and plagiarism detection tool. Students must register for Grammarly by using their student email address. In addition, students have access to face-to-face and virtual tutoring services either asynchronously via email or synchronously via Zoom. Location: J. B. Coleman Library, Rm. 209; Phone: 936-261-3724; Website: <https://www.pvamu.edu/student-success/writing-center/>; Grammarly Registration: <https://www.grammarly.com/enterprise/signup>

Academic Early Alert

Academic Early Alert is a proactive system of communication and collaboration between faculty, academic advisors, and PVAMU students that is designed to support student success by promptly identifying issues and allowing for intervention. Academic Early Alerts help students by providing a central location to schedule advising appointments, view advisor contact information, and request assistance. Students who recognize that they have a problem that is negatively affecting their academic performance or ability to continue school may self-refer an Academic Early Alert. To do so, students will log in to PV Place and click on Academic Early Alert on the left sidebar. Phone: 936-261-5902; Website: <https://www.pvamu.edu/student-success/early-alert/>

Student Counseling Services

The Student Counseling Services unit offers a range of services and programs to assist students in maximizing their potential for success: short-term individual, couples, and group counseling, as well as crisis intervention, outreach, consultation, and referral services. The staff is licensed by the State of Texas and assists students who are dealing with academic skills concerns, situational crises, adjustment problems, and emotional difficulties. Information shared with the staff is treated confidentially and in accordance with Texas State Law. Location: Hobart Taylor, 2nd floor; Phone: 936-261-3564; Website: <https://www.pvamu.edu/healthservices/student-counseling-services/>

Office of Testing Services

Testing Services serves to create opportunities by offering a suite of exams that aid in the students' academic and professional success. Currently, we administer entrance (HESI A2), college readiness (TSI assessment), Prior Learning (CLEP, DSST), and proctored exams. Location: Wilhelmina Delco, 3rd Floor, Rm. 305; Phone: 936-261-3627; Email: aetesting@pvamu.edu; Website: www.pvamu.edu/testing

Office of Diagnostic Testing and Disability Services

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, contact the Office of Disability Services. As a federally-mandated educational support unit, the Office of Disability Services serves as the repository for confidential disability files for faculty, staff, and students. For persons with a disability, the Office develops individualized ADA letters of request for accommodations. Other services include learning style inventories, awareness workshops, accessibility pathways, webinars, computer laboratory with adapted hard and software, adapted furniture, proctoring non-standardized test administrations, ASL interpreters, ALDs, digital recorders, Livescribe, and a comprehensive referral network across campus and the broader community. Location: Hobart Taylor, Rm. 1D128; Phone: 936-261-3583; Website: <https://www.pvamu.edu/disabilityservices/>

Center for Instructional Innovation and Technology Services (CIITS)

Distance Learning, also referred to as Distance Education, is the employment of alternative instructional delivery methods to extend programs and services to persons unable to attend college in the traditional manner. The Center for Instructional Innovation and Technology Services (CIITS) supports student learning through online, hybrid, web-assist, and 2-way video course delivery. For more details and contact information, visit:

<https://www.pvamu.edu/dlearning/distance-learning-2-2/students-2/>; Phone: 936-261-3283

Veteran Affairs

Veterans Services works with student veterans, current military and military dependents to support their transition to the college environment and continued persistence to graduation. The Office coordinates and certifies benefits for both the G.I. Bill and the Texas Hazlewood Act.

Location: Evans Hall, Rm. 102; Phone: 936-261-3563; Website:

<https://www.pvamu.edu/sa/departments/veteranaffairs/>

Office for Student Engagement

The Office for Student Engagement delivers comprehensive programs and services designed to meet the co-curricular needs of students. The Office implements inclusive and accessible programs and services that enhance student development through exposure to and participation in diverse and relevant social, cultural, intellectual, recreational, community service, leadership development, and campus governance. Location: Memorial Student Center, Rm. 221; Phone:

936-261-1340; Website: <https://www.pvamu.edu/studentengagement/>

Career Services

Career Services supports students through professional development, career readiness, and placement and employment assistance. The Office provides one-on-one career coaching, interview preparation, resume and letter writing, and career exploration workshops and seminars. Services are provided for students at the Northwest Houston Center and College of Nursing in the Medical Center twice a month or on a requested basis. Distance Learning students are encouraged to visit the Career Services website for information regarding services provided.

Location: Anderson Hall, 2nd floor; Phone: 936-261-3570; Website:

<https://www.pvamu.edu/careerservices/>

University Rules and Procedures

Academic Misconduct

Academic dishonesty is defined as any form of cheating or dishonesty that has the effect or intent of interfering with any academic exercise or fair evaluation of a student's performance. The college faculty can provide additional information, particularly related to a specific course, laboratory, or assignment.

You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with the *University Administrative Guidelines on Academic Integrity*, which can be found on the [Academic Integrity webpage](#). Students who engage in academic misconduct are subject to university disciplinary procedures. As listed in the *University Administrative Guidelines on Academic Integrity*, the University Online Catalog, and the Student Code of Conduct, the following are examples of prohibited conduct. This list is not designed to be all-inclusive or exhaustive. In addition to academic sanctions, any student found to have committed academic misconduct that is also a violation of criminal law may also be subject to disciplinary review and action by the Office of Student Conduct (as outlined in the Student Code of Conduct).

Forms of Academic Dishonesty:

1. **Cheating**: Deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not learned, giving or receiving aid unauthorized by the instructor on assignments or examinations. Examples: unauthorized use of notes for a test; using a "cheat sheet" on a quiz or exam; any alteration made on a graded test or exam which is then resubmitted to the teacher;
2. **Plagiarism**: Careless or deliberate use of the work or the ideas of another; representation of another's work, words, ideas, or data as your own without permission or appropriate acknowledgment. Examples: copying another's paper or answers, failure to identify information or essays from the internet and submitting or representing it as your own; submitting an assignment which has been partially or wholly done by another and claiming it as yours; not properly acknowledging a source which has been summarized or paraphrased in your work; failure to acknowledge the use of another's words with quotation marks;
3. **Collusion**: When more than one student or person contributes to a piece of work that is submitted as the work of an individual;
4. **Conspiracy**: Agreeing with one or more persons to commit an act of academic/scholastic dishonesty; and
5. **Multiple Submission**: Submission of work from one course to satisfy a requirement in another course without explicit permission. Example: using a paper prepared and graded for credit in one course to fulfill a requirement and receive credit in a different course.

Nonacademic Misconduct

The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. The Office of Student Conduct will adjudicate such incidents under nonacademic procedures.

Sexual Misconduct

Sexual harassment of students and employees at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating the university's sexual harassment policy will be subject to disciplinary action. In accordance with the Texas A&M University System guidelines, your instructor is obligated to report to the Office of Title IX Compliance (titleixteam@pvamu.edu) any instance of sexual misconduct involving a student, which includes sexual assault, stalking, dating violence, domestic violence, and sexual

harassment, about which the instructor becomes aware during this course through writing, discussion, or personal disclosure. The faculty and staff of PVAMU actively strive to provide a learning, working, and living environment that promotes respect that is free from sexual misconduct, discrimination, and all forms of violence. If students, faculty, or staff would like assistance or have questions, they may contact the Title IX Coordinator at 936-261-2144 or titleixteam@pvamu.edu. More information can be found at www.pvamu.edu/titleix, including confidential resources available on campus.

Pregnancy, Pregnancy-related, and Parenting Accommodations

Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related conditions, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Disability Services or the Dean of Students' Office for additional information and to request accommodations.

Non-Discrimination Statement

Prairie View A&M University does not discriminate on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, or gender identity in its programs and activities. The University is committed to supporting students and complying with The Texas A&M University System non-discrimination policy. It seeks to establish an environment that is free of bias, discrimination, and harassment. If you experience an incident of discrimination or harassment, we encourage you to report it. If you would like to speak with someone who may be able to afford you privacy or confidentiality, there are individuals who can meet with you. The Director of Equal Opportunity & Diversity has been designated to handle inquiries regarding the non-discrimination policies and can be reached at Harrington Science Building, Suite 109 or by phone at 936-261-1744 or 1792.

Class Attendance Policy (See the University Online Catalog for Full Attendance Policy)

Prairie View A&M University requires regular class attendance. Attending all classes supports the full academic development of each learner, whether classes are taught with the instructor physically present or via distance learning technologies such as interactive video and/or the internet. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in the assignment of a grade of "F." Absences are accumulated beginning with the first day of class during regular semesters and summer terms. Each faculty member will include the University's attendance policy in each course syllabus.

Student Academic Appeals Process

Authority and responsibility for assigning grades to students rest with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the University Online Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

Technical Considerations

Minimum Recommended Hardware and Software:

- Intel PC or Laptop with Windows 10 or later version; Mac with OS High Sierra*
- Smartphone or iPad/Tablet with Wi-Fi*
- High-speed Internet access
- 8 GB Memory
- Hard drive with 320 GB storage space
- 15" monitor, 800x600, color or 16 bit
- Sound card w/speakers

- Microphone and recording software
- Keyboard & mouse
- Most current version of Google Chrome, Safari, or Firefox

Note: Be sure to enable Java & pop-ups in the Web browser preferences

* Smartphones, Google Chrome books, and Android tablets may not be supported. iPads are the only tablets supported.

Participants should have a basic proficiency of the following computer skills:

- Sending and receiving email
- Working knowledge of the Internet
- Microsoft Word (or a program convertible to Word)
- Acrobat PDF Reader
- Windows or Mac OS
- Video conferencing software

Netiquette (online etiquette)

Students are expected to participate in all discussions and virtual classroom chats as directed. Students are to be respectful and courteous to others on discussion boards. Foul or abusive language will not be tolerated. Do not use ALL CAPS for communicating to others AS IT CAN BE INTERPRETED AS YELLING. Avoid slang terms such as "wassup?" and texting abbreviations such as "u" instead of "you." Limit and possibly avoid the use of emoticons. Be cautious when using humor or sarcasm as tone is sometimes lost in an email or discussion post, and the message might be taken seriously or sound offensive.

Video Conferencing Etiquette

When using Zoom, WebEx, or other video conferencing tools, confirm the visible area is tidy, clear of background clutter, inappropriate or offensive posters, and other distractions. Ensure you dress appropriately and avoid using high traffic or noisy areas. Stay muted when you are not speaking and avoid eating/drinking during the session. Before the class session begins, test audio, video, and lighting to alleviate technology issues.

Technical Support

Students should go to <https://mypassword.pvamu.edu/> if they have password issues. The page will provide instructions for resetting passwords and contact information if login issues persist. For other technical questions regarding eCourses, call the Center for Instructional Innovation and Technology Services at 936-261-3283 or email ciits@pvamu.edu.

Communication Expectations and Standards

Emails or discussion postings will receive a response from the instructor, usually in less than 48 hours. Urgent emails should be marked as such. Check regularly for responses.

Discussion Requirement

Online courses often require minimal to no face-to-face meetings. However, conversations about the readings, lectures, materials, and other aspects of the course can occur in a seminar fashion. The use of the discussion board will accomplish this. The instructor will determine the exact use of discussion boards.

It is strongly suggested that students type their discussion postings in a word processing application such as Word and save it to their PC or a removable drive before posting to the discussion board. This is important for two reasons: 1) If for some reason your discussion responses are lost in your online course, you will have another copy; 2) Grammatical errors can be greatly minimized by the use of the spell-and-grammar check functions in word processing applications. Once the post(s) have been typed and corrected in the word processing application, copy and paste to the discussion board.

COVID-19 Campus Safety Measures

To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, PVAMU has adopted policies and practices to limit virus transmission.

- **Self-monitoring** - Students should follow CDC recommendations for self-monitoring. Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.
- **Face Coverings** - Face coverings (cloth face covering, surgical mask, etc.) are recommended in classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource, and support offices, and outdoor spaces where 6 feet of physical distancing is challenging to maintain reliably.
- **Physical Distancing** - Physical distancing should be maintained between students, instructors, and others in the course and course-related activities where possible.
- **Personal Illness and Quarantine** - Students required to quarantine are to participate in courses and course-related activities remotely and must not attend face-to-face course activities. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities. Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence. To receive an excused absence, students must provide appropriate documentation to the Office for Student Conduct, studentconduct@pvamu.edu.

End of Semester Course Assessment Report

This summary contains the following Information

1. Performance Statistics

- Total number of students in class
- The class average performance (stated as %) in each course outcome assessed in this class and the two previous times course was assessed.
- The acceptable class average for the class in each outcome area as set by your department.
- Percentage of students who scored below the expected average in each outcome.

2. Implementation Summary

- Brief summary of plans implemented during the semester based on last assessment report

3. Perceived Problems

- Instructor's critical evaluation of perceived problems that affected students' performance. Realistic problems should be identified throughout the semester and summarized in this section of the report.

4. New Plans for Addressing Problems

- Instructor's plans for addressing the perceived problems the next time the class is taught.

5. Overall Trend over last three assessment periods

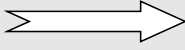
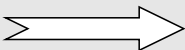
- Instructor's summary of overall performance trend for each outcome measured over the last three periods.

5. Were Expectations Met?

- Answer YES if the class average was above the expected average and the stated percentage of students scored at or above the expected average, else answer NO.

END OF SEMESTER COURSE OUTCOME ASSESSMENT REPORT
MCEG 3303-Y01 MANUFACTURING PROCESSES
 SPRING 2022 SEMESTER

Report Prepared by: Dr. Lai Jiang
Report Date: May 20, 2022

Semester	Analysis Type	Number of Students	Outcome 2 An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global cultural, social, environmental, and economic factor.			Outcome 4 An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.		
			Expected Average	Class Average	% Students Above Expected Average	Expected Average	Class Average	% Students Above Expected Average
Spring 2022	Direct	6				70	82.7	50
Fall 2021	Direct	9				70	76.4	77.8
Spring 2021	Direct	19	70	70.9	37			
Implementation Summary			1. Detailed Class slides were prepared from the textbook and made available through eCourses. 2. Similar example problems were solved in the lecture.			1. Related course materials were posted on eCourses. 2. Detailed project requirements were covered in class.		
Perceived Problems			1. Students' ability in understanding and utilize the knowledge learned in class needs to be improved. 2. Some students can come up with a good design idea or topic, but cannot express those in a clear and logical manner.			1. Many typos can be found in submitted essays. 2. Students had problems with the citation format.		
Plans for Addressing Problems			1. Further enforce class attendances and make sure more students can practice with example problems. 2. Give students more design examples so they could refer to a good one and then proceed with their own design.			1. An example essay will be provided to students as a reference in following the right format. 2. The instructor will spend more time guiding students who are below the class average.		
Overall Trend over Periods			Class average is above the expected average, but the % of students above expected average is too low.			The class average has been improved significantly, but the number of students who scored above the class average has decreased.		
Were Expectations Met?	Average ≥ 70%? and ≥ 70% students above avg.?		NO			NO		

**Grade Sheet Showing
Student and Class Performance in Outcome – 4**

Student #	Grade
1	78
2	85
3	77
4	86
5	88
6	82
Average	82.67

SPECIFIC ASSIGNMENTS USED TO ASSESS OUTCOME – 4

(As an example, both parts of a full project report are included)

Students are able to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Performance criterion:

Assessing students' ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts (Outcome - 4).

Sample Assignment: comprehensive report on a family of manufacturing processes

DEPARTMENT
OUTCOMES SPECIFIC ASSIGNMENT COVERSHEET
Manufacturing Processes Y01
Spring 2022
Instructor: Dr. Lai Jiang

Title of Assignment

**Comprehensive Report on a Family of
Manufacturing Processes**

Outcome – 4

Students' ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Brief Description of the suitability of this assignment for the outcome

This course project is designed to assess students' ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

MCEG 3303 Y01 Manufacturing Processes Course Project
Spring 2022
Comprehensive Report on a Family of Manufacturing Processes

Due: Apr. 22, 2022, at midnight

I. Project Description

Pick any of the big families of manufacturing processes introduced in this course, e.g., machining, casting, plastic manufacturing, metal processing, etc., and write a comprehensive report. In this report, you should address the manufacturing processes family you chose; introduction to this family, state-of-the-art of this family, and its future developments. You should also recognize ethical and professional responsibilities of your subject involving global, and societal contexts, as well as make informed judgments on ethical and professional responsibilities in the family you have chosen for your report while considering the impact of engineering solutions in global, economic, environmental, and societal contexts.

II. Report

A comprehensive literature review report is required from each student. The review report should follow these guidelines:

- (1) The report should be typed in a **Word file, with 1.5 lines spacing, and Times Roman 12-point font.**
- (2) Your report should **review no less than 10 pieces of literature.**
- (3) Literature should be cited properly in the report. A “List of References” should be provided at the end of the report. The **citation and references should follow the ASME format**, which can be found at: <https://www.asme.org/publications-submissions/proceedings/author-guidelines/elements-of-a-paper/references>.
- (4) The report should be **5 pages minimum, 10 pages maximum excluding the cover page and list of references.** Unnecessary spaces or blanks left in your report will be removed upon grading, so use figures and/or tables as space fillers.
- (5) The report should be organized using headings and subheadings, and should include (but not limited to) the following contents:

Title

Abstract (no more than one page) - A concise summary of your review including the scope of your review, what you found as a result of your topic. It should give the reader a complete picture of your review from the start to finish.

Introduction

Main contents

Conclusion

III. Evaluation

The report will be evaluated by the following criteria:

1. Writing quality (grammar, punctuation, writing skills): 20%
2. Presentation quality (formatting, figures, tables, references, headings): 20%
3. Technical content (completeness, relevance, how up-to-date it is, etc.): 50%
4. **Taskstream submission to Outcome 4:** 10%

**A REPORT ON PLASTIC MANUFACTURING INDUSTRIES CONDUCTED BY
STEPHUN MOREHEAD**

ABSTRACT

This report paper on plastic manufacturing industries was written after conducting exclusive research conducted on plastic manufacturing. Plastic Manufacturing is the process of making plastics into final products. Plastics are used all over the world. Plastics are used in various sectors such as household, on the farm to make some farm equipment such as horse pipes, plastics are used in motor vehicle manufacturing companies to make door grills, among many other sectors.

The research paper has explained in detail the manufacturing process of plastic. The plastic manufacturing process depends on the type of plastic being made. In the case of thermoplastics, it is made through melt processes and thus no chemical bonding. The manufacturing of thermoplastic is different from the manufacturing of thermosetting plastics. When making thermosetting, there is chemical bonding meaning that the process isn't reversible.

The paper has explained the art or technology used in manufacturing plastics. In plastic making, high technology is involved. An example is the use of CNC machines. The paper has explained the ethical responsibilities and professionalism applied in the plastic manufacturing company. The role of plastic manufacturing in building the economy has also been discussed in the paper. Contributions are not limited to the creation of employment, boosting the GDP among many other contributions. The paper has outlined the role of plastic manufacturing in conserving the environment and the value of plastic manufacturing to society. The paper ends with a one-paragraph summary.

1. INTRODUCTION

Plastic Manufacturing Family is a wide family established in various continents such as Asia, the United States of America, and Europe. The plastic manufacturing process can be defined as the process of turning plastics into worthy products. [The US is the leading country in plastic manufacturing]. The top three plastic manufacturing companies are located in the United States of America. The top companies in manufacturing plastics are; The Dow Chemical Company which is located in Midland, Michigan. The second one is the LyondellBasell located in Texas and ExxonMobil located in Irving, Texas [1].

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The most common plastics used are thermoplastics and thermosetting. Thermoplastics are made through a solidification process where degradation doesn't take place. The small plastic

components are heated into favorable shapes. The procedure of making thermostats undergoes many melt processes. There is no chemical bonding in making thermoplastics and therefore the process of making the plastic is irreversible. The plastic can be recycled or reused. Examples are polyamide and acrylic plastics. On the other hand, thermosetting plastics are made through the chemical bonding process. The plastic is exposed to high heating, radiation process, and lighting process. The plastic doesn't come back to its original state after heating but rather remains in solid form. Common examples are silicone, epoxy, and polyester [2].

2 THE MANUFACTURING PROCESS

The manufacturing process of plastics takes various forms. The manufacturing process depends on factors such as the nature of the plastic, the purpose of the plastic, and the durability of the plastic. The technology to be used will also depend on these factors. Before the manufacturing process begins, the right plastic to be manufactured is first selected. In order to select the correct type of plastic, the following factors are considered;

2.1 Factors to consider in the selection of plastic for manufacturing

2.1.1 The form of the plastic

The form of the plastic includes the internal characteristics of the plastic. The features depend on the geometric form of the plastic. There are seven types of plastics. Plastics are in thousands of varieties based on the chemical used, the additives added and the derivatives used. Plastics vary in type because they cover a wide range of roles.

These forms are: polyethylene or polyester which is commonly used for packing food and drinks. It has low chances of oxygen penetrating inside the container to destroy food. The second type of plastic is High-Density Polyethylene. It is denser, strong, and thicker. HDP is commonly used in making containers for packing shampoo and yogurt. The third type is PVC plastic. PVC is commonly used in making blood bags, toys, and medical tubes among many other products. It is the most dangerous plastic due to its leaching chemical nature. Another type of plastic is Low-Density Polyethylene. This is the most used plastic. It is used in making plastic wraps and food bags.

The fifth type of plastic is Polypropylene. The plastic is hard and can resist some heat energy. Polypropylene is used in manufacturing containers for storing hot food such as a thermos. It is a

safe plastic for keeping food and drinks. Another common plastic is polystyrene. It is used for making food containers, helmets, and egg cartons. The last type of plastic can be made by mixing the other six types of plastic. Various forms of plastics can be mixed to make the desired plastic. An example is polycarbonate plastic. Polycarbonate can be used to make bottles such as water bottles and baby bottles [3].

2.1.2 The Volume

The volume of the plastic is the amount or quantity of the plastic which is to be manufactured. Plastics to be manufactured in large quantities will have high costs. The cost will be high due to the high labor used, the large volume of materials used and the time taken to manufacture the plastic. Low volume plastics incur less cost of production. The company will therefore consider the volume of the plastic in order to budget for it before the manufacturing process.

2.1.3 The Lead Time

The lead time is about the urgency of the plastic. A client might order a high amount of plastics within 2 weeks. This will indicate that the manufacturers will have to give the production of this plastic priority. The plastic will be manufactured as quickly as possible using fast manufacturing methods. Under normal circumstances, some plastics will take 24 hours of manufacturing while others might go up to months.

2.1.4 The Material used

Plastics are made of different materials. These materials can be natural gas, cellulose, crude oil, and coal. The materials undergo two processes known as polymerization and polycondensation. The plastics can be grouped under two main families. These are thermoplastics and thermosetting. The process of making thermosetting differs from that of making thermoplastics. The manufacturer will have to choose the method of manufacturing based on the plastic family to be manufactured.

2.2 Types of Manufacturing Process and the Art used

Plastic manufacturing has got several processes. The process to be used will depend on the type of plastic being manufactured. While some plastics are taking complex and expensive procedures during manufacturing, others will take a simple procedure. All these will depend on factors such as the quality of plastic, the nature of the plastic, the function the plastic will perform, and the

urgency of the plastic. The following are the common types of plastic manufacturing and technology or art used:

2.2.2 The 3D Printing

This is a plastic-making process that forms three-dimensional parts from CAD modes by making layers of materials on top of another. These layers are built until when a physical structure is formed. This technology requires minimum time to do designs. The whole process is slow and requires a lot of labor [4]. With improved technology, the cost used falls down.

The Manufacturing Process

Here, the technology used is a print software machine. The machine is used in making and laying out plastic models within the machine and the support structures are added before dividing the models into various layers. The printing process will vary depending on the 3-dimensional type of technology used. The FDM makes a plastic filament melt, SLA is used to cure the liquid resin and SLS will fuse the plastic powder [4]. After printing, parts are taken from the printer, they are washed, cured and the structures used for support are removed.

2.2.3 Polymer Casting

In polymer casting, a reactive resin is made to fill a mold which leads to chemical reactions and the resin becomes solid. Polymers that can be cast are epoxy, silicone, and acrylic. Polymer casting is a cheap method used in making plastics and it requires little investment. It is used in short-run productions. The process is used in making jewelry [5].

Manufacturing Process

Here, the mold is covered with an agent to enhance demolding after which it gets heated to a certain room temperature. The resin is mixed with an agent to cure it before it is injected into the mold. While in the mold, it forms a mold cavity [5]. The mold gets cured through casting until it becomes solid. The mold can a time exposed to heat so it can make desired polymers. The mold gets opened and the cured part is removed. Trimming is the last procedure in polymer casting. The excess materials after casting such as seams and flash get removed.

2.2.4 Vacuum Forming

The method is also known as thermoforming. It is a method of manufacturing where a plastic is first heated then formed by an aid of a mold. Thermoforming machines differ in size depending on the complexity of the function to be performed. The cost of tools used is low due to less pressure involved. The common plastics formed through this process are; liners of the car door, shower trays, and dental aligners [6].

Manufacturing Process

First, a plastic layer is attached to a frame. The clamp and the plastic layer are taken near a heating machine meant for that purpose. The heating effect makes the plastic to be soft and flexible [6]. In a vacuum, the frame is brought down and the plastic sheet stretches over the mold. The vacuum is set to remove all the air found between the plastic and the mold through sucking. After the removal of the air through sucking, the plastic is allowed to cool down. Cooling apparatus such as fans might be used. After the release of the formed plastic, a CNC machine is used to trim the excess parts.

3. The Ethical and Professional Responsibilities, Environmental Protection, and Healthy Policies of the Plastic Industries

3.1 The Code of Ethics

The Western Plastic Companies are committed to operating a plastic business in a transparent and ethical way. The working environment is built through trust, responsibility, accountability, transparency, and credibility. It is the duty of every employee to follow and maintain the code of ethics by giving their best and remaining loyal to their work and employers.

The plastic manufacturing companies aim at protecting all the employees, the clients, the working partners and the vendors from illicit destructions committed by other firms or individuals deliberately or non-deliberately. Any wrong action is not tolerated at all costs and victims are gets punished [7].

3.2 Social Responsibilities and Societal Relations

Pro-Western Plastic Manufacturing Companies aims at operating business with social responsibility through; supporting the human rights, protecting the human environment and its

safety, establishing sustainable development, and monitoring the work process to ensure it follows legal procedures.

3.3 Environmental Sustainability

Plastic companies maintain the nature of the environment by conducting environmentally responsible practices such as taking part in cleaning the environment. They have conducted public sensitization on the importance of living in a clean environment. The companies encourage re-using plastic products. For instance, a plastic for storing margarine can be re-used by keeping salt in it. The company has also made plastic products that can be recycled after use. The company is committed to protecting and conserving natural resources [8].

4. Contributions of Plastic Companies to the Economy

Plastic manufacturing companies have taken a leading role in promoting economic development. In 2018, the companies made global sales totaling \$79 billion. The value of exported products increased by 8.5% from 2017 to 2018 [9]. Despite contributions to GDP, the companies have offered employment to people of various career paths. The plastic manufacturing companies have employed software engineers, plant engineers, chemical engineers, software experts, manual workers, and managers among many other people [9].

5. The Future Development of Plastic Companies

The plastic company is growing at a rapid rate. The excess growth is due to the high demand for plastic products globally. The numbers of companies are few as compared to the market demand. As a result, the leading plastic companies in the US have resolved to open other branches all over the world. Pro-Western Plastic Companies have a target of making sales worth \$ 754.3 billion by the year 2027 [10]. In my opinion, I see the target as achievable because of the growing demand for plastics in the world.

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6. Summary

The paper has provided a detailed work on Plastic Manufacturing Industries. The analysis given has ranged from definitions, the process of plastic making, types of plastics, the art, and technology involved in plastic making, the ethical roles of the plastic companies, the future developments of

the company, and the role of the company in economic development. The paper can be used as a guide for opening a plastic company.

References

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		Writing quality		Presentation quality						Technical content			Taskstream	Total	Curverd	Round up	
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