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19-10-2023

هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-106
2022

Annual Program Report

Program Name:	**Bachelor of Mechanical Engineering**
Program Code (as per Saudi university ranking):	**071501**
Qualification Level:	**Level 6**
Department:	**Mechanical Engineering**
College:	**Engineering**
Institution:	**Jouf University**
Academic Year:	**1444 H / 2022-2023 AD**
Main Location:	**College of Engineering, Main Campus, Sakaka, Jouf University, KSA**
Branches offering the Program (if any):	**None**

Table of Contents

A. Program Statistics

Item	Number
Number of students enrolled in the program	47
Number of students who started the program (in reporting year)	9
Number of students who completed the program	5

B. Program Assessment

1. Program Learning Outcomes Assessment and analysis according to PLOs assessment plan *

PLOs Assessment Plan

Program Learning Outcomes	2021	2022	2023	2024
PLO:1 An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	X		X	
PLO: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 factors	X		X	
PLO:3 An ability to communicate effectively with a range of audiences		X		X
PLO: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		X		X
PLO:5 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	X		X	
PLO:6 An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions		X		X
PLO:7 An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	X		X	

Assessment and Evaluation Activity	Yr-1	Yr-2	Yr-3	Yr-4
Map/Review educational strategies (courses) to performance indicators	X		X	
Review mapping and identify where data will be collected	X		X	
Develop and/or review assessment methods used to assess performance indicators	X		X	
Collect data		X		X
Evaluate assessment data and assessment processes, determine actions		X		X
Report findings		X		X
Take action where necessary		X		X

PLO's	Knowledge and Understanding	Skills	Values
PLO 1	✓	✓	
PLO 2	✓	✓	
PLO 3		✓	
PLO 4			✓
PLO 5			✓
PLO 6		✓	
PLO 7			✓

PLOs Assessment Results

#	Program Learning Outcomes	Assessment Methods (Direct and Indirect)	Targeted Performance (%)	Assessment Results
Skills				
S3	An ability to communicate effectively with a range of audiences.	Direct assessment (Courses)	75%	86% Average 97% Attainment
		Indirect assessment (Course Evaluation Survey)	75%	90%
		Indirect assessment (Program Evaluation Survey)	75%	81%
		Indirect assessment (Alumni Survey)	75%	86%
		Indirect assessment (Employers Survey)	75%	88%
S4	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	Direct assessment (Courses)	75%	85% Average 94% Attainment
		Indirect assessment (Course Evaluation Survey)	75%	88%
		Indirect assessment (Program Evaluation Survey)	75%	81%
		Indirect assessment (Alumni Survey)	75%	80%
		Indirect assessment (Employers Survey)	75%	92%
Values, autonomy, and responsibility				
V1	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.	Direct assessment (Courses)	75%	91% Average 97% Attainment
		Indirect assessment (Course Evaluation Survey)	75%	92%
		Indirect assessment (Program Evaluation Survey)	75%	87%

	Indirect assessment (Alumni Survey)	75%	82%
	Indirect assessment (Employers Survey)	75%	88%

Strengths:

- All PLOs were assessed this year and all PLOs assessment results (direct and indirect) showed good achievement which were above the targeted level.
- When calculating the mean achievements of direct assessment for learning domains, all domains have been achieved more than that of the targeted performance as follow:
  i. Knowledge domain (79%)
  ii. Skills domain (82%)
  iii. Values domain (88%)
- Results of PLOs S3, S4, and V1, according to the assessment plan, show that the targeted PLOs for this academic year achieved well above the set target (75%) indicating that the actions taken by the program were measurable and effective.
- In all PLOs, undergraduate students expressed very high satisfaction in courses evaluation, which exceeded the level of 4.2 (84%) out of 5 (100%) points survey.
- Senior students expressed high or very high satisfaction in all PLOs for evaluating the mechanical engineering program.
- Six PLOs out of seven showed very high employers satisfaction. The remaining PLO (V2) showed high satisfaction, which exceeded the level of 3.4 (68%) to 4.2 (84%) points survey.
- Four PLOs out of seven showed very high alumni satisfaction. The remaining PLOs (S4, V1, and V2) showed high satisfaction level.

Aspects that need improvement with priorities:

- Provide students with feedback using the rubrics to see if there were common areas of weakness in student performance that should be emphasized with students in later courses.
- Complete the approving process and implement the updated ME curriculum (benchmarked with high-ranked ME programs in national and international universities to reflect state-of-the-art ME curriculum).
- Complete the approving process and implement the updated courses contents (benchmarked with high-ranked ME programs in national and international universities to reflect state-of-the-art ME curriculum).

2. Evaluation of Courses

Course Code	Course Title	Number of Students Who Evaluated the Course	Percentage of Participants	Evaluation Results (out of 5)	Developmental Recommendations
MEC 101	Engineering drawing	25	85%	4.22	More Focus on Drawing Dimensions is required
MEC 102	Engineering Design 1	31	90.6%	4.12	Fill the Gap Between Academia and Practical Life
MEC 103	Engineering Economy	37	100%	6.46	Increase students level of solving engineering economics problem
MEC 104	Engineering Design 2	24	73.3%	5	Assign Students to model more Problems
MEC 105	Basics of Engineering Technology	24	100%	5	Lab Reports should contain some Basic Question regarding the practical conducted
MEC 211	Materials Engineering	7	100%	4.33	It is recommended to assign more time to explain joining of metals
MEC 212	Materials Engineering Lab	7	100%	4.33	It is recommended to use different types of materials in testing process
MEC 213	ME Drawing & Graphics	7	100%	4.33	
MEC 214	Mechanics of Materials	14	100%	4.59	
MEC 215	Mech. of Materials Lab	15	100%	4.9	
MEC 232	Dynamics	11	83.3%	4.56	
MEC 321	Heat Transfer	22	90.5%	3.87	Offer recent and useful references to students
MEC 331	Manufacturing Proc. (1)	21	96.5%	4	Following up the continuous progress of the students in the course
MEC 342	Thermo-fluid lab-1	21	91%	4.5	

Course Code	Course Title	Number of Students Who Evaluated the Course	Percentage of Participants	Evaluation Results (out of 5)	Developmental Recommendations
MEC 322	Sustainable Thermal Energy	15	100%	4.31	Assign students to solve more problems
MEC 323	Special Topics in Mech. Eng.	20	100%	3.815	Motivate students in the course
MEC 333	Manufacturing Proc.	23	100%	5	
MEC 311	Mech. Eng. Design (1)	17	100%	4.5	Improve students design skills
MEC 334	Automatic Control	7	100%	4.75	Use MAT Lab for mini project to simulate PID Controller
MEC 335	Control and dynamic systems Lab.	13	100%	4.45	Increase number of Lab reports
MEC 412	Computer Aided Design	6	100%	5	Focus on Solid Works, require more practice
MEC 411	Mech. Eng. Design (2)	11	100%	5	Assign students to solve more problems related to design different Machine elements.
MEC 461	Electrical Machines	8	100%	5	It is recommended to continue with the same strategies.
MEC 421	Power Plants	14	94.3%	4.25	Continue with the same strategies.
MEC 441	Gas Dynamics	11	100%	4.96	Following up the continuous progress of the students in the course
MEC 452	Engineering Projects Management	9	100%	5	Explain using MS Project app and apply it on the Student's course projects.

3. Students Evaluation of Program Quality

Evaluation Date: Beginning of the Third Trimester 2022-2023	Number of Participants: 19
Students Feedback	**Program Response**
Strengths: • I had the appropriate academic and professional guidance during my study period • The teaching staff in the department had great knowledge of the content of the courses they are studying. • Library resources were appropriate and available whenever I needed them. • What I learned in this program (department) will be important for my future.	Outcomes of the surveys were analyzed and program strength and weakness were discussed to take possible measures for further improvement of the program quality.
Areas of Improvement: • Computer labs were adequate for my needs. • The program helped me develop my basic skills in using technology to study issues and express results. • I am generally satisfied with the level of quality of my educational experience in the program.	• The Facilities and Learning Resources Committee will study and analyze the requirements of ME department. • Quality Assurance Committee will review the quality of the courses taught in ME Program.
Suggestions for improvement: • An experienced Lab. Technician may appointed for each Lab. • Seminars/ workshops should be arranged to share advancement in related fields.	The Facilities and Learning Resources Committee will study and analyze the ME department and propose recruitment plan as well a recruitment plan accordingly.

* Survey report of student's evaluation of program quality – Annex S.8

4. Scientific research and innovation during the reporting year

Activities Implemented	Number
Published scientific research	23
Current research projects	5
conferences organized by the program	0
Seminars held by the program	0
Conferences attendees	6
Seminars attendees	6

Discussion and analysis of scientific research and innovation activities

The program has six faculty members who published 23 papers during the academic year 1444, which accounts for 3.83 paper per faculty member. In addition, the faculty members of the program hold five funded research projects. Moreover, every faculty member in the program attended a conference and a seminar during the academic year 1444.

5. Community Partnership

Activities Implemented	Brief Description*
Partnership proposal	The ME program has proposed a partnership with Wayne State University that can cooperate in improving quality of different aspects. Partnership's proposal will enhance the educational and research process. This partnership benefit and develop different quality aspects of the program.
Comment on community partnership activities**	
The ME program will be regularly assessed and evaluated the effectiveness of partnership including educational and research based on achieved outcomes and results of the partnership goals. Based on the evaluation, an improvement plan will be developed accordingly to overcome the shortages and accomplish the fully/partially unachieved goals.	

6. Other Evaluation (if any)

(e.g., independent reviewer, program advisory committee, and stakeholders (e.g., faculty members, alumni, and employers)

Evaluation method: ME Teaching Staff Survey	Date: End of Third Trimester 2022-2023	Number of Participants: 6
Summary of Evaluator Review		Program Response
Strengths: • The standards for the provision of teaching, laboratory and research facilities are commensurate with the program and are benchmarked with comparable institutions. • The facilities suit the needs of its users among people with physical disabilities and special needs.		Faculty members feedback reports were evaluated and analyzed in order to take necessary measures to further improvement in quality of the ME program.
Areas for Improvements: • Acquire licensed software so that advanced simulation based work can be published in high impact journals • The University provides a sufficient number of faculty members to perform academic guidance and assist the students. • There are effective systems to assist academically low grade students, and encourage outstanding students. adoptability to acquire new knowledge.		Faculty members survey pointed out some areas to further improve the quality of the program as identified here.

* Survey report of ME Teaching Staff on Program Evaluation – Annex S.3

Evaluation method: Alumni Survey	Date: End of Third Trimester 2022-2023	Number of Participants: 10
Summary of Evaluator Review		**Program Response**
Strengths: • Ability for problem Solving Skills, Personnel Skills, Planning and organizing Skills. • 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 • Employer rank self-management skills as 94% Student positive attitude as 92 %.		Alumni Feedback survey was evaluated and analyzed in order to take necessary measures to further improvement in quality of the ME program.
Areas for Improvements: • An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. • An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. • Flexibility and management of priorities. • Improve adoptability to acquire new knowledge.		Feedback Survey of the Alumni other than Students proposed some areas to further improve the quality of the program as identified here.
Suggestions for development: • Follow up the continuous improvement plan as proposed by the Alumni. • Apply the teaching strategies that focus on learner centered approach.		Alumni survey outcome proposed a strategic approach to further improve the quality of learning in ME Program.

* Survey report of Alumni on Program Evaluation – Annex S.19

Evaluation method: Employers Survey	Date: End of Third Trimester 2022-2023	Number of Participants: 10
Summary of Evaluator Review		**Program Response**
Strengths: • An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. • An ability to communicate effectively with a range of audiences.		Employers feedback reports were evaluated and analyzed based on outcome of the survey necessary measures were taken to further improvement in ME program quality.
Points for Improvements: • An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.		Employers feedback proposed some areas to further improve the quality of the program as identified here.

• An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. • Ability to take Initiative and enterprise.	
Suggestions for development: • Follow up the continuous improvement plan as proposed by the Employers. • Apply advance simulation tools to product design.	Based on the employers survey a strategic approach has been formulated to further improve the quality of learning in ME Program.

* Survey report of Employers on Program Evaluation – Annex S.20

C. Program Key Performance Indicators (KPIs)

Including the key performance indicators required by the NCAAA.

No	KPI	Targeted Value	Actual Value	Internal Benchmark	Analysis	New Target
1	Percentage of achieved indicators of the program operational plan objectives.	70%	78%	87%	The value of this indicator tended to decrease from 72% to 66% along the academic years 2020-21 and 2021-22 then increased to 78% in last academic year 2022-23. The target is achieved. The improvement plans that were implemented for the operational plan showed improvement.	75%
2	Students' Evaluation of quality of learning experience in the program.	4.7	3.86	4.23	Statistical data of the "ME Students Survey on Evaluating the Mechanical Engineering Program" shows a 3.86 actual benchmark, which is slightly lower than the value achieved in previous year. It is also noted that this indicator tends to decrease along the past three years. Therefore, the new target has been reduced.	4.2
3	Students' evaluation of the quality of the courses.	4.6	4.453	4.47	This indicator shows that the actual benchmark (4.453) is based on course evaluation surveys conducted by the ME students for courses taught in the year 2022-2023. It is noted that actual benchmark value is slightly less than target benchmark (4.6). Although ME department has taken appropriate measures to improve the quality of the courses. The quality assurance committee decided to set achievable target benchmark at 4.5.	4.5

4	Completion rate.	70%	56%	64%	The value of this indicator has increased by 15.6% from last year achievement but didn't achieve the set target. Therefore, the target has been maintained on the aim of achieving this target in the near future.	70%
5	First-year students retention rate.	100%	100%	100%	The values of this indicator tend to be maintained at 100% in the last three years, indicating a positive polarity trend. This positive polarity indicates that the academic advising committee plays an important and effective role to guide first-year students to continue in the program for the next year.	100%
6	Students' performance in the professional and/or national examinations.	Not Available				
7	Graduates' employability and enrolment in postgraduate programs.	50%	52%	69%	The values of this indicator achieved the target due to the industrial development in the region.	50%
		10%	5%	0%	The actual target of the graduates' enrolment in postgraduate programs was very low because the graduates prefer to get a job rather than postgraduate program studies.	5%
8	Average number of students in the class.	9	6.4	4.5	The average number of students per class tended to be very low in the last two years due to the low number of enrolled students into the program.	9
9	Employers' evaluation of the program	4.6	4.3	4.2	The indicator value shows that the actual benchmark (4.3) is	4.5

	graduates proficiency.				based on evaluation surveys conducted in the year 2022-2023 amongst employers of ME program graduates. The actual benchmark value has increased, compared to previous year achievement (3.6), indicating a very high satisfaction of the employers. However, the achieved value is still below the set target. Therefore, additional actions will be needed to achieve the target.	
10	Students' satisfaction with the offered services.	4.2	4.2	4.6	The indicator value shows the actual benchmark value for 2022-2023 is 4.2 and is based on the survey “ME Students Survey on the Quality of Academic Advising, Psychological, and Professional Services” conducted amongst ME students for the year 2022-20223. It is noted that the actual benchmark achieved set target for the previous year (2021-2022). This indicates the institute’s and department’s maintain success in improving the quality of the academic advising and the ambitions of the program. The quality assurance committee has decided to set the new target benchmark to 4.3.	4.3
11	Ratio of students to teaching staff.	8 :1	7.8:1	2.5:1	The trend of this indicator is decreasing due to the low number of students enrollment in the program.	8:1
12	Percentage of teaching staff distribution.	Assist. P: 60%	Assist. P: 83.3%	Assist. P: 77% Assoc. P:	The targeted percentages distribution didn't occur in the last	Assist. P: 60%

		Assoc. P: 30% Prof.: 10%	Assoc. P: 0% Prof.: 16.7%	23% Prof.: 0%	years due to COVID-19 effect on recruitment process of faculty members in the program.	Assoc. P: 30% Prof: 10 %
13	Proportion of teaching staff leaving the program.	0%	0%	4%	The number of faculty members is constant due to no one left the ME department in 2022-23 academic year.	0%
14	Percentage of publications of faculty members.	100%	100%	100%	Every faculty members in the program has published at least one paper.	100%
15	Rate of published research per faculty member.	5:1	3.38:1	10.6:1	The six faculty members in the program have published 23 papers during the last year.	3:1
16	Citations rate in refereed journals per faculty member.	30:1	67.2:1	11.9:1	The total number of citations was 407 and the number of published papers was 23.	25:1
17	Satisfaction of beneficiaries with the learning resources.	4.5	3.88	4.46	Actual bench mark value (3.88) achieved is lower than target benchmark (4.5) this occurred due to lower number of stake holders took part in survey. Survey Committee has decided to create awareness about the importance of the survey feedback.	4.2
18	Number of research groups in the program.	3	2	3	Two research groups extended from the last year.	2
19	The number of subsidized research projects that the program's staff obtain annually.	5	5	0	Four funded research projects extended from the last year and one added during this year.	3
20	Percentage of students participating in extra-curricular activities.	30%	40%	24%	The indicator is higher than the target, and this is evidence of the active participation of students	40%

					in extracurricular activities	
21	Employer's satisfaction with the program's mission, vision and objectives.	4.6	4.43	3.82	The actual benchmark value for 2022-2023 is 4.43 and is based on the survey "Employer Feedback Survey on Mechanical Engineering Vision-Mission & Objectives" for the year 2022-2023. This actual benchmark is slightly lower than the target benchmark (4.6). However, it is higher than previous year. Therefore, the new target has been reduced to 4.5 on the aim of achieving it next year.	4.5
22	Percentage of student graduation projects related to the community.	100%	100%	100%	The program had 3 graduation projects during the year 2022-2023. All the topics of these projects were related to the surrounding community in terms of both domestic and agricultural use.	80%

Comments on the Program KPIs and Benchmarks results:

Twenty-one KPIs have been measured for the 2022-2023 academic year and ten KPIs achieved the target. Also, the KPI-P-01 (Percentage of achieved indicators of the program operational plan objectives) achieved the target and increased from 66% (2021-2022) to 78% (2022-2023), which indicates that the improvement plans that were implemented for the operational plan showed good improvement. Also, the increase in the citation rate (KPI-P-16) this year results from the increase in the number of publication that agrees with recent research points. Although, improvement plans have been developed on the aim of achieving the set target next year for the unachieved KPIs and other achieved ones as well. Details of these improvement plans are clearly described in the KPIs report of this academic year (2022-2023).

D. Challenges and difficulties encountered by the program (if any)

Teaching	None
Assessment	None
Guidance and counseling	None
Learning Resources	None
Faculty	The ME program is in the process of recruiting additional faculty members according to the recruitment plan.
Research Activities	None
Others	None

E. Program development Plan

No.	Priorities for Improvement	Actions	Action Responsibility
1	Complete the approving process and implement the updated ME curriculum and courses contents to fulfill the followings: *- Gradually train students on technical writing earlier than senior year levels.* *- Revamping the CAD content across the ME curriculum to include entry level, intermediate and advanced applications of solid modeling and simulation.* *- Overhauls the entire ME program curriculum, tracks, required courses and electives to reflect the state-of-the-art curriculum with benchmarking of well-establish ME programs in major Saudi and International universities.* *- Develop a student-centered teaching and learning strategy in the ME courses.*	- Complete the approving process (including external reviews) of the updated ME curriculum and courses contents. - Implement the updates and assess the effectiveness regularly.	Academic Affairs and Study Plans Committee
2	Develop and implement a mechanism to decide, record,	The ME program will develop and implement a	Quality Assurance Committee

	follow-up, and evaluate the effectiveness of all actions, through semester and annual evaluation basis.	mechanism to decide, record, follow-up, and evaluate the effectiveness of all actions.	
3	The ME program should resolve the unbalanced specialization in the faculty line by supporting more engineering mechanics/design/control faculty with more concurrent field experience and curriculum development experience.	The ME program will implement the approved recruitment plan of faculty members and complete the recruitment process.	- Head of the Department - Program Coordinator
4	The ME Program should implement partnership regulations with other parties the needed quality aspects of the program, including courses, educational resources, teaching, student achievement standards, and offered services.	Implement the approved partnership and assess its effectiveness regularly and develop improvement plans accordingly.	Quality Assurance Committee

Assessment of Program Actions for Previous Report (Program Actions Evaluation 1444 H)

F. Approval of Annual Program Report

COUNCIL / COMMITTEE	DEPARTMENT OF MECHANICAL ENGINEERING COUNCIL
REFERENCE NO.	MEETING NO. 6
DATE:	16-10-2023