MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC - Autonomous)
(Approved by AICTE, New Delhi &Affiliated to JNTUA, Anantapuramu)
P.B.No. 14, Angallu, Madanapalle – 517325, Chittoor Dist., Andhra Pradesh, India.
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Department of Mechanical Engineering

Date: 25th July 2019

Composition and approval of Program Assessment Committee (PAC)

Following members are nominated and approved for constitutions of Assessment Committee (PAC).

1. Dr T N Srinivasa, Dean and Head, Mechanical Engineering, MITS
2. Dr P Suryanarayana Raju, Professor, Mechanical Engineering, MITS
3. Dr Prasanna Kumar Duvvi, Professor, Mechanical Engineering, MITS
4. Dr J S Senthil Kumar, Professor, Mechanical Engineering, MITS
5. Dr S Thamizhmanii, Professor, Mechanical Engineering, MITS

Responsibilities of the committee:

1. Monitors attainment of COs, POs and PSOs
2. PAC evaluates programme effectiveness and process necessary changes
3. Preparation of periodic reports, records on program activities, progress and status reports.

TNS

HoD/ME

Principal

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Madanapalle Institute of
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Copy to

- The Principal
- The Vice-Principal (Academics)
- Programme Assessment Committee
- Department File

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Department of Mechanical Engineering

Minutes of Meeting and Recommendations of PAC

Department PAC meeting was held on 16th December 2019, following are the discussions and resolutions made in the meeting.

1. For the subject FLUID MECHANICS, the course attainment for CO1, CO2, and CO4 is not satisfactory. The knowledge of partial differential equations necessary to understand and appreciate the fluid governing equations. It is advised that a minimum of 3 classes are devoted to revising the advanced calculus basics before the governing equations are introduced. Abstract concepts like vapor pressure, cavitation, and surface tension are hard to comprehend. The instructor should teach these concepts in an applied way. More problems with the applications of Bernoulli's equation need to be solved in the classroom and remedial classes.

2. For the subject HEAT TRANSFER, the course attainment for CO5 is low. The use of right Nusselt number correlations for internal flow, external flow, natural convection should be explained clearly to the students. A simplified chart for choosing the right correlation is suggested for easy identification for slow learners. It is advised that a number of diverse examples of problems are solved so that the students understand the concepts easily.

3. For the subject MATERIAL SCIENCE AND ENGINEERING, the course attainment for CO2 is low. CO2 directly handles the content of unit 2. A high level of analytical concepts of physics is discussed here which include XRD, diffraction mechanisms, etc. Strong inclination towards imagination, basic mathematical and physics concepts are needed. Since most of the students may find difficulty, it is advised to reframe the syllabus and content of Unit 2 for R18 regulation.

4. For the subject MACHINE DESIGN II, the course attainment for CO1 and CO4 is low. The CO3 addresses the concept of key and coupling, and CO4 addresses the design of the shaft. Unit 3 jointly addresses the CO3 and CO4. As the students have an internal choice of answering either one of these, most of the students might have answered the question of key and coupling over the design of the shaft.

5. For the subject CAD/CAM, the course attainment for CO2, CO3, CO4, CO5 is low. It is advised that there should be more number of remedial classes as there is no preliminary course for CAD/CAM.

6. For the subject PRODUCTION TECHNIQUES I, the course attainment is low for all COs. For the subsequent batches, a faculty should be allotted to provide more support to the students taking MOOCs classes in terms of giving them in-class practice for solving problems.

7. For the subject APPLIED THERMODYNAMICS, the course attainment is low for CO2 and CO4. It is advised that the faculty should focus on solving various numerical problems on Rankine cycle. Faculty should help the students in understanding the basics of Rankine cycle and work on different cycles. The faculty should stress more on solving a variety of numerical example problems on compressors.

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Department of Mechanical Engineering

Actions taken based on the results of evaluation of each of the COs, POs & PSOs

POs & PSOs Attainment Levels and Actions for improvement – 2014-18 batch

Pos	Target Level	Attainment Level	Observations
PO1.Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.			
PO1	0.75	0.77	Target is achieved. However, CO attainment is low a few courses including 14ME110. This was delivered in MOOCs mode and students struggled to score good grades in the final exam conducted by NPTEL
Action 1: For the subsequent batches' faculty, provided more support to the students taking MOOCs classes in terms of giving them in class practice for solving problems.			
PO2.Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and Engineering sciences.			
PO2	0.75	0.76	Target is achieved. However, attainment is low in some relevant courses like 14ME102 and 14ME110.
Action 1: To address the low CO attainment in the course Mechanics of Solids (14ME102), faculty are instructed to stress more on the first unit which is on Engineering Mechanics. Action 2: It was noticed that students are lacking the required basics for design courses since there is no course on Engineering Mechanics. This course is being added in R18 regulation.			
PO3.Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			
PO3	0.75	0.77	Target is achieved. However, attainment is low in Project work (14ME502).
Action 1: Faculty guides are instructed to concentrate more the methodologies employed by the students in performing the project tasks.			
PO4.Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.			
PO4	0.75	0.77	Target is achieved. However, attainment is low in some related courses. The actions taken for addressing the above POs are expected to affect this PO as well.
Action 1: Action N:			

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PO5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.			
PO5	0.75	0.79	Target is achieved, Attainment is low in some practical courses like ME210 CAD/CAM Lab.
Action 1: Faculty are instructed provide thorough inputs to the students during the lab hours so that they can correctly use the software tools for design and analysis of mechanical components. Action 2: Workshops and trainings are conducted to provide additional training for the students in modern tool usage.			
PO6.The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			
PO6	0.75	0.81	Target is achieved. However, there are very limited courses in the curriculum which address this PO.
Action 1: Topics related societal aspects in engineering profession are to be covered, wherever relevant, in core engineering courses.			
PO7.Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
PO7	0.75	0.74	Target not achieved. There are only a few courses thatdirectly address this PO. Topics should be taught in other courses to address the environment and sustainability issues.
Action 1: More out of syllabus topics to be covered in engineering courses to cover the environment and sustainability related issues. Action 2: Faculty are instructed to concentrate on environmental issue in Lab instruction as well as in student projects			
PO8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	0.75	0.71	Target not achieved. There are only a few courses that directly address this PO. Topics should be taught in other courses to address the environment and sustainability issues.
Action 1: Faculty are advised to cover topics beyond syllabus to address the ethical issues in engineering practice. Action 2: Guest lectures are arranged on what level of performance is expected from engineering graduates in Industry.			
PO9.Individual and team work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO9	0.75	0.78	Target is achieved. However, very few courses directly address this PO.
Action 1: SAE student chapter is started in the Department through which many students are participating in design competitions and other team events.			
PO10.Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			

PO10	0.75	0.78	Target is achieved. However, employer feed back points to deficiency in communication skills among the graduates.
Action 1: Additional verbal training is provided to the students.			
PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.			
PO11	0.75	0.79	Target is achieved. However, only few courses address this PO
Action 1: The faculty advisors for the professional society activities like SAE design competetions are instructed to teach proper project management methodologies to student teams to ensure on-time and on-budget completion of the designs.			
PO12. Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change. PSOs are initially framed in preparation for design of the program core curriculum.			
PO12	0.75	0.78	Target is achieved. However, courses in the curriculum only weakly address this PO
Action 1: Guest lectures by prominent engineering professionals are arranged for students so that they learn further extensions of basic concepts they learn in college and grow an appreciation for continuous learning.			
PSO1: Apply concepts and principles from Applied Mechanics to design, develop and evaluate mechanical systems for a specified purpose.			
PSO1	0.75	0.77	Target is achieved. However, attainment is low is some design courses.
Action 1: Additional training is provided to students in final years which was aimed at improving their performance in technical rounds of campus placement drives. Action 2: Mock interviews are conducted, and students are sensitized to the nature of questions that are asked in the technical interviews and breadth and depth of core engineering topics that are covered in interviews. Action 3: GATE training is provided by the department faculty to improve the performance of the students in all core subjects.			
PSO2: Employ governing laws of thermodynamics, fluid flow and heat transfer for design and analysis of thermo-fluid systems.			
PSO2	0.75	0.76	Target is achieved. However, attainment is low is some thermal engineering courses.
Action 1: Additional training is provided to students in final years which was aimed at improving their performance in technical rounds of campus placement drives.			

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Action 2: Mock interviews are conducted, and students are sensitized to the nature of questions that are asked in the technical interviews and breadth and depth of core engineering topics that are covered in interviews. Action 3: GATE training is provided by the department faculty to improve the performance of the students in all core subjects.			
PSO3: Utilize the knowledge and learning of materials and manufacturing sciences to design, plan and monitor production operations in an Industry.			
PSO3	0.75	0.77	Target is achieved. However, attainment is low is some production courses.
Action 1: Additional training is provided to students in final years which was aimed at improving their performance in technical rounds of campus placement drives. Action 2: Mock interviews are conducted, and students are sensitized to the nature of questions that are asked in the technical interviews and breadth and depth of core engineering topics that are covered in interviews. Action 3: GATE training is provided by the department faculty to improve the performance of the students in all core subjects.			

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Actions taken based on the results of the evaluation of each of the COs, POs & PSOs

POs & PSOs Attainment Levels and Actions for improvement – 2015-19 batch

Pos	Target Level	Attainment Level	Observations
PO1.Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.			
PO1	0.75	0.74	Very nearer to the target. However, CO attainment is low few courses. Some of the courses were delivered in MOOCs mode and students struggled to score good grades in the final exam conducted by NPTEL.
Action 1: For the subsequent batches' faculty, provided more support to the students taking MOOCs classes in terms of giving them in-class practice for solving problems.			
PO2.Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and Engineering sciences.			
PO2	0.75	0.73	Very nearer to the Target. However, attainment is low in some relevant courses like 14ME102 and 14ME107.
Action 1: The low CO attainment in the course Mechanics of Solids (14ME102), faculty are instructed to stress more on the first unit, which is on Engineering Mechanics. Action 2: It was noticed that students are lacking the required basics for design courses since there is no course on Engineering Mechanics. This course is being added to the R18 regulation			
PO3.Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.			
PO3	0.75	0.73	Very nearer to the Target. However, attainment is low in Mini Project work (14ME501).
Action 1: Faculty guides are instructed to concentrate more on the methodologies employed by the students in performing the project tasks.			
PO4.Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data, and synthesis of the information to provide valid conclusions.			
PO4	0.75	0.71	Target not achieved. However, attainment is low in some related courses. The actions taken for addressing the above POs are expected to affect this PO as well.
Action 1: Faculties are advised to adopt the research-oriented teaching and solve some practical/ day-to-day problems to motivate the students towards research.			

PO5.Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.			
PO5	0.75	0.73	Very nearer to the Target. Attainment is low in some practical courses like 14ME210 CAD/CAM Lab and 14ME501.
Action 1: Faculty are instructed to provide thorough inputs to the students during the lab hours so that they can correctly use the software tools for the design and analysis of mechanical components. Action 2: Workshops and training are conducted to provide additional training for the students in modern tool usage.			
PO6.The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.			
PO6	0.75	0.81	Target is achieved. However, there are very limited courses in the curriculum which address this PO.
Action 1: Topics related societal aspects in the engineering profession are to be covered, wherever relevant, in core engineering courses.			
PO7.Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.			
PO7	0.75	0.77	Target is achieved. The action taken based on the previous report would have helped in achieving the target.
Action 1: Faculty are instructed to concentrate on environmental issues in Lab instruction as well as in student projects.			
PO8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.			
PO8	0.75	0.76	Target is achieved. Faculty were advised to cover topics addressing the ethical issues in engineering practice.
Action 1: Guest lectures are arranged on what level of performance is expected from engineering graduates in Industry.			
PO9.Individual and team work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.			
PO9	0.75	0.76	Target is achieved. However, very few courses directly address this PO.
Action 1: SAE student chapter is started in the Department through which many students are participating in design competitions and other team events.			
PO10.Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.			
PO10	0.75	0.74	Very nearer to the target. However, employer feedback points to deficiency in communication skills among the graduates.
Action 1: Additional verbal training is provided to the students.			
PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.			
PO11	0.75	0.77	Target is achieved. However, only a few courses address this PO

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Action 1: The faculty advisors for the professional society activities like SAE design competitions are instructed to teach proper project management methodologies to student teams to ensure on-time and on-budget completion of the designs			
PO12. Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change. PSOs are initially framed in preparation for design of the program core curriculum.			
PO12	0.75	0.75	Target is achieved. However, courses in the curriculum only weakly address this PO
Action 1: Guest lectures by prominent engineering professionals are arranged for students so that they learn further extensions of basic concepts they learn in college and grow an appreciation for continuous learning.			
PSO1: Apply concepts and principles from Applied Mechanics to design, develop and evaluate mechanical systems for a specified purpose.			
PSO1	0.75	0.70	Target not achieved. Attainment is low in design courses. To compensate this, Engineering Mechanics was introduced into the R18 curriculum.
Action 1: Additional training is provided to students in final years which were aimed at improving their performance in technical rounds of campus placement drives. Action 2: Mock interviews are conducted, and students are sensitized to the nature of questions that are asked in the technical interviews and breadth and depth of core engineering topics that are covered in interviews. Action 3: GATE training is provided by the Departmental faculty to improve the performance of the students in all core subjects			
PSO2: Employ governing laws of thermodynamics, fluid flow and heat transfer for design and analysis of thermo-fluid systems.			
PSO2	0.75	0.73	Very nearer to the Target. Attainment is low is some thermal engineering courses.
Action 1: Additional training is provided to students in final years which were aimed at improving their performance in technical rounds of campus placement drives.			
PSO3: Utilize the knowledge and learning of materials and manufacturing sciences to design, plan and monitor production operations in an Industry.			
PSO3	0.75	0.78	Target is achieved. However, attainment is low is some production courses.
Action 1: Additional training is provided to students in final years which were aimed at improving their performance in technical rounds of campus placement drives. Action 2: Mock interviews are conducted, and students are sensitized to the nature of questions that are asked in the technical interviews and breadth and depth of core engineering topics that are covered in interviews. Action 3: GATE training is provided by the Departmental faculty to improve the performance of the students in all core subjects.			

Note: *For the 2015-19 batch, the CO attainment level has been raised to 55% for all the courses as we had achieved >90% attainment for all the POs for 2014-18 batch.*

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