Course Code: 15EMEC303 **Course Title: Introduction to Finite Element Methods**

L-T-P: 3-0-0	Credits: 3	Contact Hrs: 3 hrs/week
ISA Marks:50	ESA Marks: 50	Total Marks: 100
Teaching Hrs: 40		Exam Duration: 3 hrs

Unit - 1

1. Introduction to FEM:
FEM paradigm : History, present/future, Research, Application, stress at a point, stress components on arbitrary plane, Equilibrium equations, compatibility equations, Generalized Hook's law, Plane stress and plain strain, literature survey and research methodologies. — 07 hrs

2. Fundamentals of FEM: Principle of minimum potential energy and virtual work, RR method and Galerkin's methods, FEM steps, Advantages, disadvantages and limitations. Discretization process, types of elements, size of elements, location of node, node numbering scheme and mesh requirements in finite element method — 08 hrs

Unit - 2

3 Interpolation Functions For General Element Formulation :polynomial form of interpolation functions, convergence requirements, Pascal triangle, shape functions (1D, 2D, LST, CST, Quad, Higher order elements), Stiffness matrix and its properties — 07 hrs

4. Analysis of Bars, Trusses and beams : Solution for displacements, reaction forces and stresses by using elimination approach and penalty approach. Solution to plane trusses for displacement, reactions and stresses. Truss stiffness matrix and solutions.
Introduction, Structural analysis of beams; solution for displacements, reaction forces and stresses. — 08 hrs

Unit - 3

5.FEA analysis:
Illustrate the concept of linear static analysis, Non-linear analysis: Material, Geometry and Contact nonlinearity, Linear buckling analysis, Dynamic analysis, and Thermal analysis using practical applications. — 05 hrs

6. Advanced FEA analysis:
Optimization - Shape/Material, Crash/Impact/Drop test analysis, Fatigue analysis: Stress based and Strain based approach — 05 hrs

Text Books (List of books as mentioned in the approved syllabus)

1. K. H. Huebner, D. L. Dewhirst, D. E. Smith and T. G. Byrom, The Finite Element Method for Engineers, 4th edition, Wiley, New York, 2001.
2. T. R. Chandraputala and A. D. Belegundu, Introduction to Finite Elements in Engineering, Third Edition, Prentice Hall of India, 2004.
3. Nitin Ghokale, Practical finite element analysis, Finite to infinite, 2008.

References Reference Book:

1. Introduction to the Finite Element Method, by N. S. Ottosen and H. Petersson. Prentice-Hall, Englewood Cliffs, 1992.
2. S. S. Rao, Finite Element Method in Engineering , Fourth Edition, Elsevier Publishing, 2007

KLE Technological University
Creating Value, Leveraging Knowledge

School of Mechanical Engineering

Course Feedback – 2018-19 (Even Semester)

(To be filled by each Student at the time of Course Completion)

Dear Students,

Please give us your views on this Course so that the course quality can be improved. You are encouraged to be frank and constructive in your comments.

Course Teacher

School of Mechanical Engineering. Name of the Teacher Introduction to finite elements method Shridhar

Course Title FEM Course code: 15EME Semester 6th

a. The design of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The course objectives were clear		✓			
The course contents met with your expectation		✓			
The course work load was manageable		✓			
The lecture sequence was well planned to meet learning outcomes		✓			
The contents were illustrated with adequate examples		✓			
The course exposed you to new knowledge and practice		✓			
The level of the course was moderate		✓			

b. The conduct of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The lectures were easy to understand & ideas and concepts presented clearly		✓			
The teaching aids were effectively used		✓			
The course material handed out was adequate		✓			
Were objectives of the course realized?		✓			
The overall environment in the class was conducive to learning		✓			

c. Learning Resources	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
Learning materials (Lesson Plans, Course Notes etc.) were relevant and useful			✓		
Recommended reading Books etc. were relevant and appropriate		✓			
The provision of learning resources in the library was adequate and appropriate		✓			

d. Assessment	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The method of assessment were reasonable			✓		
Feedback on CIE assessment was timely		✓			
Feedback on CIE assessment was helpful		✓			

Suggestions for improvement:

Good

Overall rating of the course: (√tick mark the appropriate)

90% -100% ☐ 90%70% - 80% ✓ - 70%50% - ☐ Below 50% ☐ ☐ ☐

Date: 9/05/19

Signature

KLE Technological University

School of Mechanical Engineering

Course Feedback – 2018-19 (Even Semester)

(To be filled by each Student at the time of Course Completion)

Dear Students,

Please give us your views on this Course so that the course quality can be improved. You are encouraged to be frank and constructive in your comments.

Course Teacher

School of Mechanical Engineering. Name of the Teacher Shridhar

Course Title Introduction to FEM Course code: EMEC 303 Semester 6th

a. The design of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The course objectives were clear		✓			
The course contents met with your expectation		✓			
The course work load was manageable		✓			
The lecture sequence was well planned to meet learning outcomes		✓			
The contents were illustrated with adequate examples	✓				
The course exposed you to new knowledge and practice		✓			
The level of the course was moderate		✓			

b. The conduct of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The lectures were easy to understand & ideas and concepts presented clearly		✓			
The teaching aids were effectively used		✓			
The course material handed out was adequate	✓				
Were objectives of the course realized?		✓			
The overall environment in the class was conducive to learning		✓			

c. Learning Resources	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
Learning materials (Lesson Plans, Course Notes etc.) were relevant and useful		✓			
Recommended reading Books etc. were relevant and appropriate			✓		
The provision of learning resources in the library was adequate and appropriate		✓			

d. Assessment	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The method of assessment were reasonable		✓			
Feedback on CIE assessment was timely			✓		
Feedback on CIE assessment was helpful		✓			

Suggestions for improvement:

Overall rating of the course: (√tick mark the appropriate)

90% -100% ☐ 90%70% - 80% ✓ - 70%50% - ☐ Below 50% ☐ ☐ ☐

Signature

Date: 10/5/19

KLE Technological University

School of Mechanical Engineering

Course Feedback – 2018-19 (Even Semester)

(To be filled by each Student at the time of Course Completion)

Dear Students,

Please give us your views on this Course so that the course quality can be improved. You are encouraged to be frank and constructive in your comments.

Course Teacher

School of Mechanical Engineering. Name of the Teacher Balachandra

Course Title FEM Course code: 18MEC303 Semester VI^th

a. The design of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The course objectives were clear	✓				
The course contents met with your expectation	✓				
The course work load was manageable	✓				
The lecture sequence was well planned to meet learning outcomes	✓				
The contents were illustrated with adequate examples	✓				
The course exposed you to new knowledge and practice	✓				
The level of the course was moderate	✓				

b. The conduct of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The lectures were easy to understand & ideas and concepts presented clearly	✓				
The teaching aids were effectively used	✓				
The course material handed out was adequate	✓				
Were objectives of the course realized?	✓				
The overall environment in the class was conducive to learning	✓				

c. Learning Resources	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
Learning materials (Lesson Plans, Course Notes etc.) were relevant and useful	✓				
Recommended reading Books etc. were relevant and appropriate	✓				
The provision of learning resources in the library was adequate and appropriate	✓				

d. Assessment	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The method of assessment were reasonable	✓				
Feedback on CIE assessment was timely	✓				
Feedback on CIE assessment was helpful	✓				

Suggestions for improvement:

Overall rating of the course: (√tick mark the appropriate)

90% -100% [✓] 90%70% - 80% [ ] % - 70%50% - [ ] Below 50% [ ]

Signature

Date:

KLE Technological University

School of Mechanical Engineering

Course Feedback – 2018-19 (Even Semester)

(To be filled by each Student at the time of Course Completion)

Dear Students,

Please give us your views on this Course so that the course quality can be improved. You are encouraged to be frank and constructive in your comments.

Finite Element Method. Course Teacher Prof. Shridhar.

School of Mechanical Engineering. Name of the Teacher _____

Course Title _____ Course code: _____ Semester VI

a. The design of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The course objectives were clear					✓
The course contents met with your expectation					✓
The course work load was manageable					✓
The lecture sequence was well planned to meet learning outcomes					✓
The contents were illustrated with adequate examples					✓
The course exposed you to new knowledge and practice					✓
The level of the course was moderate					✓

b. The conduct of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The lectures were easy to understand & ideas and concepts presented clearly					✓
The teaching aids were effectively used					✓
The course material handed out was adequate					✓
Were objectives of the course realized?					✓
The overall environment in the class was conducive to learning					✓

c. Learning Resources	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
Learning materials (Lesson Plans, Course Notes etc.) were relevant and useful					✓
Recommended reading Books etc. were relevant and appropriate					✓
The provision of learning resources in the library was adequate and appropriate					✓

d. Assessment	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The method of assessment were reasonable					✓
Feedback on CIE assessment was timely					✓
Feedback on CIE assessment was helpful					✓

Suggestions for improvement:

Good

Overall rating of the course: (√tick mark the appropriate)

90% -100% ☐ 90%70% - 80% ☐ - 70%50% - ☐ Below 50% ☑ ☐ ☐

Date: 10/5/19

Signature

KLE Technological University

School of Mechanical Engineering

Course Feedback – 2018-19 (Even Semester)

(To be filled by each Student at the time of Course Completion)

Dear Students,

Please give us your views on this Course so that the course quality can be improved. You are encouraged to be frank and constructive in your comments.

Course Teacher

School of Mechanical Engineering. Name of the Teacher Sridhar Rao.

Course Title Introduction to finite element Course code: Semester VI

a. The design of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The course objectives were clear	✓				
The course contents met with your expectation	✓				
The course work load was manageable	✓				
The lecture sequence was well planned to meet learning outcomes	✓				
The contents were illustrated with adequate examples	✓				
The course exposed you to new knowledge and practice	✓				
The level of the course was moderate	✓				

b. The conduct of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The lectures were easy to understand & ideas and concepts presented clearly	✓				
The teaching aids were effectively used	✓				
The course material handed out was adequate	✓				
Were objectives of the course realized?	✓				
The overall environment in the class was conducive to learning	✓				

c. Learning Resources	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
Learning materials (Lesson Plans, Course Notes etc.) were relevant and useful	✓				
Recommended reading Books etc. were relevant and appropriate	✓				
The provision of learning resources in the library was adequate and appropriate	✓				

d. Assessment	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The method of assessment were reasonable	✓				
Feedback on CIE assessment was timely	✓				
Feedback on CIE assessment was helpful	✓				

Suggestions for improvement:

Overall rating of the course: (√tick mark the appropriate)

90% -100% ☑ 90%70% - 80% ☐ - 70%50% - ☐ Below 50% ☐ ☐ ☐

Date: 10-04-2019.

Signature

School of Mechanical EngineeringKLETECH

KLE Technological University, Hubli

Alumni Feedback 2018-19

Dear proud alumni,

The following are the list of skills and competencies that engineering graduates should have. We seek your participation in the Alumni Survey conducted to know your satisfaction with the *level of competency* you have achieved as a result of your education at the Institution and also able to practice the same. For each question, indicate your opinion with a tick mark(✓) in the appropriate column. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head, School of Mechanical Engineering

S.No	Competencies	Level of Competency			
		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
1	**Engineering knowledge :**				
	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialisation for the solution of engineering problems			✓	
2	**Problem analysis:**				
	Ability to identify, characterise and formulate a solution plan for solving engineering problems				✓
	Ability to execute a solution process and analyse results				✓
3	**Design/Development of Solutions:**				
	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process			✓	
4	**Conduct investigations of complex problems:**				
	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems			✓	
	Ability to critically analyse and interpret data to reach valid conclusions			✓	
5	**Modern tool usage:**				
	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems			✓	
6	**The engineer and society:**				
	Demonstrate an understanding of professional engineering regulations, legislation and standards			✓	

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7	**Environment and sustainability:**	Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development				✓
8	**Ethics:**				
	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice			✓	
9	**Individual and team work:**				
	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings				✓
10	**Communication:**				
	Ability to comprehend technical literature and prepare effective reports and design documents			✓	
	Demonstrate competence in listening, speaking, and presentation			✓	
11	**Project management and finance:**				
	Demonstrate knowledge and understanding of the engineering and 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			✓	
12	**Life-long learning:**				
	Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change			✓	
13	**Engineering Drawing & Modelling:**				
	Use modern CAD tools and appropriate design standards to develop component and system drawings.			✓	
14	**Manufacturing:**				
	Apply the knowledge of manufacturing processes to develop a component with appropriate consideration for productivity, quality and cost.			✓	
15	**Preventive Maintenance of Mechanical Systems:**				
	Demonstrate knowledge and understanding of the principles of preventive maintenance and apply those to develop schedule for machine tools.			✓	

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School of Mechanical EngineeringKLETECH

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Alumni Feedback 2018-19

Indicate your Answer with symbol "✓" in the appropriate box.

1) How would you rate your overall satisfaction with your preparation to become an engineer?

Not Satisfied ☐ Little Satisfied ☐ Satisfied ☑ Very Satisfied ☐

2) In general, the department has provided a _____ quality academic program?

Poor ☐ OK ☑ Good ☐ Very Good ☐

Name: Kushal . Chowdar:	Branch: Mechanical
e-mail id: Mobile:	Batch: 2019
Name of the company:	
Correspondence Address:	
Signature: Kushal.	

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HUBBALLI-580 031

School of Mechanical EngineeringKLETECH

KLE Technological University, Hubli

Alumni Feedback 2018-19

Dear proud alumni,

The following are the list of skills and competencies that engineering graduates should have. We seek your participation in the Alumni Survey conducted to know your satisfaction with the *level of competency* you have achieved as a result of your education at the Institution and also able to practice the same. For each question, indicate your opinion with a tick mark(✓) in the appropriate column. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head, School of Mechanical Engineering

S.No	Competencies	Level of Competency			
		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
1	**Engineering knowledge :**				
	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialisation for the solution of engineering problems			✓	
2	**Problem analysis:**				
	Ability to identify, characterise and formulate a solution plan for solving engineering problems			✓	
	Ability to execute a solution process and analyse results			✓	
3	**Design/Development of Solutions:**				
	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process				✓
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	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems			✓	
	Ability to critically analyse and interpret data to reach valid conclusions			✓	
5	**Modern tool usage:**				
	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems			✓	
6	**The engineer and society:**				
	Demonstrate an understanding of professional engineering regulations, legislation and standards			✓	

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		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
7	**Environment and sustainability:**				
	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development			✓	
8	**Ethics:**				
	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice			✓	
9	**Individual and team work:**				
	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			✓	
10	**Communication:**				
	Ability to comprehend technical literature and prepare effective reports and design documents			✓	
	Demonstrate competence in listening, speaking, and presentation			✓	
11	**Project management and finance:**				
	Demonstrate knowledge and understanding of the engineering and 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			✓	
12	**Life-long learning:**				
	Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change			✓	
13	**Engineering Drawing & Modelling:**				
	Use modern CAD tools and appropriate design standards to develop component and system drawings.			✓	
14	**Manufacturing:**				
	Apply the knowledge of manufacturing processes to develop a component with appropriate consideration for productivity, quality and cost.			✓	
15	**Preventive Maintenance of Mechanical Systems:**				
	Demonstrate knowledge and understanding of the principles of preventive maintenance and apply those to develop schedule for machine tools.				✓

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Alumni Feedback **2018-19**

Indicate your Answer with symbol "✓" in the appropriate box.

1) How would you rate your overall satisfaction with your preparation to become an engineer?

Not Satisfied ☐ Little Satisfied ☐ Satisfied ☑ Very Satisfied ☐

2) In general, the department has provided a _____ quality academic program?

Poor ☐ OK ☐ Good ☑ Very Good ☐

Name: Yash Dhand	Branch: Mechanical
e-mail id: Mobile: 8147237322	Batch: 2019
Name of the company:	
Correspondence Address:	
Signature: Yash D.	

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Alumni Feedback 2018-19

Dear proud alumni,

The following are the list of skills and competencies that engineering graduates should have. We seek your participation in the Alumni Survey conducted to know your satisfaction with the *level of competency* you have achieved as a result of your education at the Institution and also able to practice the same. For each question, indicate your opinion with a tick mark(✓) in the appropriate column. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head, School of Mechanical Engineering

S.No	Competencies	Level of Competency			
		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
1	**Engineering knowledge :**				
	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialisation for the solution of engineering problems				✓
2	**Problem analysis:**				
	Ability to identify, characterise and formulate a solution plan for solving engineering problems				✓
	Ability to execute a solution process and analyse results				
3	**Design/Development of Solutions:**				
	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process				✓
4	**Conduct investigations of complex problems:**				
	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems				✓
	Ability to critically analyse and interpret data to reach valid conclusions				
5	**Modern tool usage:**				
	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems				✓
6	**The engineer and society:**				
	Demonstrate an understanding of professional engineering regulations, legislation and standards				✓

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		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
7	**Environment and sustainability:**				
	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development			✓	
8	**Ethics:**				
	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice			✓	
9	**Individual and team work:**				
	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings				✓
10	**Communication:**				
	Ability to comprehend technical literature and prepare effective reports and design documents				✓
	Demonstrate competence in listening, speaking, and presentation				
11	**Project management and finance:**				
	Demonstrate knowledge and understanding of the engineering and 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				✓
12	**Life-long learning:**				
	Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change			✓	
13	**Engineering Drawing & Modelling:**				
	Use modern CAD tools and appropriate design standards to develop component and system drawings.				✓
14	**Manufacturing:**				
	Apply the knowledge of manufacturing processes to develop a component with appropriate consideration for productivity, quality and cost.				✓
15	**Preventive Maintenance of Mechanical Systems:**				
	Demonstrate knowledge and understanding of the principles of preventive maintenance and apply those to develop schedule for machine tools.			✓	

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KLE Technological University, Hubli

Alumni Feedback **2018-19**

Indicate your Answer with symbol "✓" in the appropriate box.

1) How would you rate your overall satisfaction with your preparation to become an engineer?

Not Satisfied ☐ Little Satisfied ☐ Satisfied ☐ Very Satisfied ☑

2) In general, the department has provided a Very good quality academic program?

Poor ☐ OK ☐ Good ☐ Very Good ☑

Name: Mr. Sunil N.	Branch: Mechanical Engineering
e-mail id: Mobile: 8050708060	Batch: 2019
Name of the company: JSW, Torangallu.	
Correspondence Address: JSW, Torangallu	
Signature:	

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Alumni Feedback 2018-19

Dear proud alumni,

The following are the list of skills and competencies that engineering graduates should have. We seek your participation in the Alumni Survey conducted to know your satisfaction with the *level of competency* you have achieved as a result of your education at the Institution and also able to practice the same. For each question, indicate your opinion with a tick mark(✓) in the appropriate column. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head, School of Mechanical Engineering

S.No	Competencies	Level of Competency			
		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
1	**Engineering knowledge :**				
	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialisation for the solution of engineering problems				✓
2	**Problem analysis:**				
	Ability to identify, characterise and formulate a solution plan for solving engineering problems			✓	
	Ability to execute a solution process and analyse results			✓	
3	**Design/Development of Solutions:**				
	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process				✓
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	Demonstrate an understanding of professional engineering regulations, legislation and standards				✓

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		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
7	**Environment and sustainability:**				
	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development				✓
8	**Ethics:**				
	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice				✓
9	**Individual and team work:**				
	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			✓	
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	Ability to comprehend technical literature and prepare effective reports and design documents				✓
	Demonstrate competence in listening, speaking, and presentation				✓
11	**Project management and finance:**				
	Demonstrate knowledge and understanding of the engineering and 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			✓	
12	**Life-long learning:**				
	Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change				✓
13	**Engineering Drawing & Modelling:**				
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14	**Manufacturing:**				
	Apply the knowledge of manufacturing processes to develop a component with appropriate consideration for productivity, quality and cost.			✓	
15	**Preventive Maintenance of Mechanical Systems:**				
	Demonstrate knowledge and understanding of the principles of preventive maintenance and apply those to develop schedule for machine tools.			✓	

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Indicate your Answer with symbol "✓" in the appropriate box.

1) How would you rate your overall satisfaction with your preparation to become an engineer?

Not Satisfied ☐ Little Satisfied ☐ Satisfied ☐ Very Satisfied ☑

2) In general, the department has provided a _____ quality academic program?

Poor ☐ OK ☐ Good ☐ Very Good ☑

Name: Rohit Bandage	Branch: Mechanical
e-mail id: Mobile: 7353444227	Batch:
Name of the company:	
Correspondence Address:	
Signature: Rohit	

REGISTRAR
KLE Technological University
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School of Mechanical EngineeringKLETECH

KLE Technological University, Hubli

Alumni Feedback 2018-19

Dear proud alumni,

The following are the list of skills and competencies that engineering graduates should have. We seek your participation in the Alumni Survey conducted to know your satisfaction with the *level of competency* you have achieved as a result of your education at the Institution and also able to practice the same. For each question, indicate your opinion with a tick mark(✓) in the appropriate column. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head, School of Mechanical Engineering

S.No	Competencies	Level of Competency			
		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
1	**Engineering knowledge :**				
	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialisation for the solution of engineering problems			✓	
2	**Problem analysis:**				
	Ability to identify, characterise and formulate a solution plan for solving engineering problems			✓	
	Ability to execute a solution process and analyse results			✓	
3	**Design/Development of Solutions:**				
	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process				✓
4	**Conduct investigations of complex problems:**				
	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems				✓
	Ability to critically analyse and interpret data to reach valid conclusions				✓
5	**Modern tool usage:**				
	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems			✓	
6	**The engineer and society:**				
	Demonstrate an understanding of professional engineering regulations, legislation and standards			✓	

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		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
7	**Environment and sustainability:**				
	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development			✓	
8	**Ethics:**				
	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice			✓	
9	**Individual and team work:**				
	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			✓	
10	**Communication:**				
	Ability to comprehend technical literature and prepare effective reports and design documents			✓	
	Demonstrate competence in listening, speaking, and presentation			✓	
11	**Project management and finance:**				
	Demonstrate knowledge and understanding of the engineering and 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			✓	
12	**Life-long learning:**				
	Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change			✓	
13	**Engineering Drawing & Modelling:**				
	Use modern CAD tools and appropriate design standards to develop component and system drawings.			✓	
14	**Manufacturing:**				
	Apply the knowledge of manufacturing processes to develop a component with appropriate consideration for productivity, quality and cost.				✓
15	**Preventive Maintenance of Mechanical Systems:**				
	Demonstrate knowledge and understanding of the principles of preventive maintenance and apply those to develop schedule for machine tools.			✓	

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Indicate your Answer with symbol "✓" in the appropriate box.

1) How would you rate your overall satisfaction with your preparation to become an engineer?

Not Satisfied ☐ Little Satisfied ☑ Satisfied ☐ Very Satisfied ☐

2) In general, the department has provided a Good quality academic program?

Poor ☐ OK ☑ Good ☐ Very Good ☐

Name: Sumant K.G	Branch: Mechanical Engg.
e-mail id: Mobile: 8971204667	Batch: 2019
Name of the company: Robert - Bosch, Bl lore	
Correspondence Address: RBEI, Bl lore	
Signature:	

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B.V Bhoomaraddi College of
Engineering & Technology, Hubli

Employers Feedback form

Dear Sir/Madam,

We seek your kind participation in this process of collecting feedback about our graduates serving in your organization. Your inputs will be helping us to make required modifications in the existing curriculum, pedagogy to enhance the competencies of the graduating engineers. For each question, indicate your opinion with a tick mark in the appropriate column. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head of the Department/School:

Please rank the following qualities: **5** = excellent, **4** = high, **3** = good, **2** = average, **1** = low, NA= Not Applicable

S.No.	Qualities	1	2	3	4	5	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems					Ξ	
2	Ability to identify, characterize and formulate a solution plan for solving engineering problems					Ξ	
3	Ability to execute a solution process and analyze results				Ξ		
4	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process				Ξ		
5	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems				Ξ		
6	Ability to critically analyse and interpret data to reach valid conclusions			Ξ			
7	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems					Ξ	
8	Demonstrate an understanding of professional engineering regulations, legislation and standards			Ξ			
9	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development				Ξ		

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10	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice				☰		
	Qualities	1	2	3	4	5	NA
11	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings				☰		
12	Ability to comprehend technical literature and prepare effective reports and design documents				☰		
13	Demonstrate competence in listening, speaking, and presentation				☰		
14	Demonstrate knowledge and understanding of the engineering and 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				☰		
15	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change				☰		
16	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.					☰	
17	An ability to apply design and development principles in the construction of software systems of varying complexity.			☰			

Space for comments: I am pretty much happy with the Quality of the engineers hired from BVP College of Engg, Hubli.

Name of the organization: Central Engineering
Applied Materials India
Inventor 1st Floor, ITPB
Whitefield Road, Bangalore 560066

Name of the contact person: Hanish Kumar P K

e-mail id: Hanish_Kumar@amat.com

Signature & seal:

KLE Technological University Mail

Placement Cell KLE TU,Hubballi -formerly BVBCET <placement@kletech.ac.in>

Request for "Employer Feedback" -- Continental

Thimmaiah S, Rithin <rithin.thimmaiah.s@continental-corporation.com> Tue, Jun 25, 2019 at 3:05 PM
To: "Placement Cell, KLE Technological University, Hubballi (formerly BVBCET)" <placement@kletech.ac.in>
Cc: "Panicker, Rajesh" <rajesh.panicker@continental-corporation.com>

Dear Kerure Sir,

We have received positive feedback in terms of the students' commitment and attitude. They have been able to cope well with our culture and have been performing well in the responsibilities that are assigned to them.

Regards

Rithin

[Quoted text hidden]

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Dear Sir/Madam,

We seek your kind participation in this process of collecting feedback about our graduates serving in your organization. Your inputs will be helping us to make required modifications in the existing curriculum, pedagogy to enhance the competencies of the graduating engineers. For each question, indicate your opinion with a tick mark in the appropriate column. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head of the Department/School

School of Mechanical Engineering

Please rank the following qualities: 5 = excellent, 4 = high, 3 = good, 2 = average, 1 = low, NA= Not Applicable

S.No.	Qualities	1	2	3	4	5	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems				✓		
2	Ability to identify, characterize and formulate a solution plan for solving engineering problems			✓			
3	Ability to execute a solution process and analyze results			✓			
4	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process		✓				
5	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems				✓		
6	Ability to critically analyse and interpret data to reach valid conclusions					✓	
7	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems			✓			
8	Demonstrate an understanding of professional engineering regulations, legislation and standards				✓		
9	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development			✓			

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10	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice		✓				
	Qualities	1	2	3	4	5	NA
11	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			✓			
12	Ability to comprehend technical literature and prepare effective reports and design documents				✓	1	
13	Demonstrate competence in listening, speaking, and presentation			✓			
14	Demonstrate knowledge and understanding of the engineering and 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				✓		
15	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change			✓			
16	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.		✓				
17	An ability to apply design and development principles in the construction of software systems of varying complexity.						✓

Space for comments:

Name of the organization: DIVGI TORQTRANSFER SYSTEMS PVT. LTD.	
Address: BANAVASI ROAD SIRSI - 581 401 (N.K.)	
Name of the contact person: Manjunath K Naik	
e-mail id: mknaik@divgi-tts.com.	Signature & seal:

For DIVGI TORQTRANSFER SYSTEMS PVT. LTD.

AUTHORISED SIGNATORY

Employers Feedback form

Dear Sir/Madam,

We seek your kind participation in this process of collecting feedback about our graduates serving in your organization. Your inputs will be helping us to make required modifications in the existing curriculum, pedagogy to enhance the competencies of the graduating engineers. For each question, indicate your opinion with a tick mark in the appropriate column. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head of the Department/School

Please rank the following qualities: 5 = excellent, 4 = high, 3 = good, 2 = average, 1 = low, NA= Not Applicable

S.No.	Qualities	1	2	3	4	5	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems		✓				
2	Ability to identify, characterize and formulate a solution plan for solving engineering problems		✓	✓			
3	Ability to execute a solution process and analyze results						
4	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process			✓			
5	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems			✓			
6	Ability to critically analyse and interpret data to reach valid conclusions			✓			
7	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems			✓			
8	Demonstrate an understanding of professional engineering regulations, legislation and standards				✓		
9	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development				✓		

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10	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice			✓			
	Qualities	1	2	3	4	5	NA
11	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			✓			
12	Ability to comprehend technical literature and prepare effective reports and design documents			✓			
13	Demonstrate competence in listening, speaking, and presentation			✓			
14	Demonstrate knowledge and understanding of the engineering and 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			✓			
15	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change			✓			
16	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.				✓		
17	An ability to apply design and development principles in the construction of software systems of varying complexity.				✓		

Space for comments:

Name of the organization: Robert Bosch Engineering & Business Solutions Private Limited	
Address:	
Name of the contact person: Bharath. K	
e-mail id: bharath.kalgaish@in.bosch.com	Signature & seal:

Curriculum Revision

Course: Introduction to Finite Element Methods **Code: 15EMEC303**
Course Instructor: Shivanand Patil, Arun Patil, Santosh Billur, Sridhar M

Course: Finite Element Methods Code: 19EMEC301
Course Instructor: Arun Patil, Sridhar M, Gururaj F, Balachandra H

2018-19 Program Outcomes Mapping	Attainment	Inputs	2019-20 Program Outcomes Mapping
PO1-1	3.0	Faculty Experiences (Course feedbacks/Student interactions/others): Based on the research experience of faculties sustainability based problems along with case studies were focused	PO1-1 PO2-3 PO4-2 PO7-2 PO10-2
PO2-2	2.7	Industry Advises/inputs: Opinion of domain experts were also considered from companies such as Altair, Ansys, Design Tech.	
PO07-2	3.0	Placement Feedbacks: Students who are placed for service based companies such as Easi technologies, Quest global, Tata Hitachi	
PO10-2	3.0	Other inputs (*specify*): NA	

Innovations/Changes:		BOS approved
a. CO added	CO's considered as-is in comparison to earlier semester except the inclusion of PO4 which focuses on complex problems solving (incremental level of complexity for example changing the contacts from welded to frictional) design and development based on the field problem worked in FEM Lab (As part of assessment of field problem is done in theory)	☑
b. PO added	PO4	☑
c. Content/topic added/refined	Title of the subject changed from Introduction to Finite Element method to Finite Element Method	☑
d. Delivery	Demonstration and Teaching	☑

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e. Assessment	Assessment was retained as-is in the earlier semester	☑
f. Any other		☐

Faculty Signature

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Exit Survey 2018-19

Responses received: 165

Segregation of responses:

#	Competencies	Level of Competency			
		Completely dissatisfied (CD)	Dissatisfied (D)	Satisfied (S)	Completely satisfied (S)
1	Engineering knowledge : Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems	1	10	100	54
2	Problem analysis: Ability to identify, characterize and formulate a solution plan for solving engineering problems	0	8	87	70
	Ability to execute a solution process and analyse results	0	11	87	67
3	Design/Development of Solutions: Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process	0	7	86	72
4	Conduct investigations of complex problems: Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems	1	14	90	60
	Ability to critically analyse and interpret data to reach valid conclusions	1	16	85	63
5	Modern tool usage: Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems	1	14	72	78
6	The Engineer and Society: Demonstrate an understanding of professional engineering regulations, legislation and standards	1	16	75	73
7	Environment and Sustainability: Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development	0	10	94	61
8	Ethics: Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	2	7	87	69
9	Individual and team work: Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	1	9	62	93
10	Communication: Ability to comprehend technical literature and prepare effective reports and design documents	0	6	84	75
	Demonstrate competence in listening, speaking, and presentation	0	2	82	81
11	Project management and finance: Demonstrate knowledge and understanding of the engineering and 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	1	12	91	61
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	1	11	83	70
13	Engineering Drawing & Modelling: Use modern CAD tools and appropriate design standards to develop component and system drawings.	0	6	69	90
14	Manufacturing: Apply the knowledge of manufacturing processes to develop a component with appropriate consideration for productivity, quality and cost.	4	13	82	66
15	Preventive Maintenance of Mechanical Systems: Demonstrate knowledge and understanding of the principles of preventive maintenance and apply those to develop schedule for machine tools.	4	20	76	65

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Responses in percentages:

PO	CD	D	CS	S	CD+D
	%				
1	1	6	61	33	7
2	0	5	53	42	6
	0	7	53	41	
3	0	4	52	44	4
4	1	8	55	36	**10**
	1	10	52	38	
5	1	8	44	47	9
6	1	10	45	44	10
7	0	6	57	37	6
8	1	4	53	42	5
9	1	5	38	56	6
10	0	4	51	45	3
	0	1	50	49	
11	1	7	55	37	8
12	1	7	50	42	7
13	0	4	42	55	4
14	2	8	50	40	**10**
15	2	12	46	39	**15**

Consider the top 4 POs where respondents were not satisfied with the level of competency they attained.

PO	Competencies	%
15	Preventive Maintenance	15
4	Conduct investigations of complex problems	10(18)
6	The Engineer & Society	10(13)
14	Manufacturing	10

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Indirect Survey Data Consolidation and Analysis

Alumni Survey

Responses received: 71

Segregation of responses:

#	Competencies	Level of Competency			
		Completely dissatisfied (CD)	Dissatisfied (D)	Satisfied (S)	Completely satisfied (S)
1	Engineering knowledge : Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems	0	2	53	16
2	Problem analysis: Ability to identify, characterize and formulate a solution plan for solving engineering problems	1	7	49	14
	Ability to execute a solution process and analyse results	1	6	51	13
3	Design/Development of Solutions: Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process	0	15	46	10
4	Conduct investigations of complex problems: Ability to conduct Investigations or tests through design of experiments to understand and solve engineering problems	4	24	30	13
	Ability to critically analyse and interpret data to reach valid conclusions	1	21	35	14
5	Modern tool usage: Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems	2	15	40	14
6	The Engineer and Society: Demonstrate an understanding of professional engineering regulations, legislation and standards	2	14	43	12
7	Environment and Sustainability: Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development	0	7	46	18
8	Ethics: Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	0	5	38	28
9	Individual and team work: Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	0	1	30	40
10	Communication: Ability to comprehend technical literature and prepare effective reports and design documents	0	7	34	30
	Demonstrate competence in listening, speaking, and presentation	0	7	36	28
11	Project management and finance: Demonstrate knowledge and understanding of the engineering and 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	0	10	37	24
12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	1	7	42	21
13	Engineering Drawing & Modelling: Use modern CAD tools and appropriate design standards to develop component and system drawings.	2	15	39	15
14	Manufacturing: Apply the knowledge of manufacturing processes to develop a component with appropriate consideration for productivity, quality and cost.	2	14	40	15

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15	Preventive Maintenance of Mechanical Systems: Demonstrate knowledge and understanding of the principles of preventive maintenance and apply those to develop schedule for machine tools.	4	12	48	7

Responses in percentages:

PO	CD	D	CS	S	CD+D
	%				
1	0	3	75	23	3
2	1	10	69	20	11
	1	8	72	18	10
3	0	21	65	14	21
4	6	34	42	18	39
	1	30	49	20	31
5	3	21	56	20	**24**
6	3	20	61	17	**23**
7	0	10	65	25	10
8	0	7	54	39	7
9	0	1	42	56	1
10	0	10	48	42	10
	0	10	51	39	10
11	0	14	52	34	14
12	1	10	59	30	11
13	3	21	55	21	24
14	3	20	56	21	**23**
15	6	17	68	10	**23**

Consider where more than 20%respondents were not satisfied with the level of competency they attained.

PO	Competencies	%
4	**Conduct investigations of complex problems**	**35**
5	Modern Tool Usage	24
13	Drawing & Modelling	24
14	Manufacturing	23
15	Preventive Maintenance	23
6	**The Engineer & Society**	**23**
3	Design & Development of Solutions	21

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Employer Survey

Responses received: 27

Segregation of responses:

PO	Competencies	Level of Competency					
		1 (Low)	2 (Average)	3 (Good)	4 (Very Good)	5 (Excellent)	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems	0	1	9	11	6	0
2	Ability to identify, characterize and formulate a solution plan for solving engineering problems	0	1	9	12	5	0
	Ability to execute a solution process and analyse results	0	1	8	11	7	0
3	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process	0	2	9	12	3	1
4	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems	1	2	8	11	4	1
	Ability to critically analyse and interpret data to reach valid conclusions	0	3	5	15	4	0
5	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems	1	1	8	11	6	0
6	Demonstrate an understanding of professional engineering regulations, legislation and standards	0	2	10	9	5	1
7	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development	0	1	7	11	8	0
8	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice	1	2	8	7	9	0
9	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	0	0	8	10	9	0
10	Ability to comprehend technical literature and prepare effective reports and design documents	0	3	6	12	6	0
	Demonstrate competence in listening, speaking, and presentation	1	2	4	10	10	0
11	Demonstrate knowledge and understanding of the engineering and 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	0	2	7	9	9	0
12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change	1	1	7	13	5	0
13	Use modern CAD tools and appropriate design standards to develop component and system drawings	1	0	7	8	9	2
14	Apply the knowledge of manufacturing processes to develop a component with appropriate consideration for productivity, quality and cost	1	2	8	10	5	1

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15	Demonstrate knowledge and understanding of the principles of preventive maintenance and apply those to develop schedule for machine tools.	0	3	3	10	5	6

Responses in percentages:

PO	1 (Low)	2 (Average)	3 (Good)	4 (Very Good)	5 (Excellent)	L+A
1	0	4	33	41	22	4
2	0	4	33	44	19	4
	0	4	30	41	26	4
3	0	7	33	44	11	7
4	4	7	30	41	15	**11**
	0	11	19	56	15	
5	4	4	30	41	22	7
6	0	7	37	33	19	7
7	0	4	26	41	30	4
8	4	7	30	26	33	**11**
9	0	0	30	37	33	0
10	0	11	22	44	22	**11**
	4	7	15	37	37	
11	0	7	26	33	33	7
12	4	4	26	48	19	7
13	4	0	26	30	33	4
14	4	7	30	37	19	**11**
15	0	11	11	37	19	**11**

Consider where more than 10% respondents were not satisfied with the level of competency they attained.

PO	Competencies	%
4	**Conduct investigations of complex problems**	**11**
8	**Ethics**	**11**
10	Communication	11
14	Manufacturing	11
15	Preventive Maintenance	11

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13-04-2019

Minutes of the BOS Meeting in School of Mechanical Engineering

The meeting of the BOS in Mechanical Engineering was held on 13th April 2019 at 10.00am in the Office of the School Head, Mechanical Engineering, KLE Technological University, Hubballi.

The meeting began with the Chairman welcoming members of the BOS and other invited faculty and student members. The following agenda points were taken up for discussion.

Agenda 1:

Review of actions initiated in the last meeting.

Resolution 1:

The actions initiated in the previous BOS held on 7th April 2018 were reviewed and minutes of the last meeting were confirmed.

The action taken report presented to the board was approved by the members.

The Chairman informed the members about the Industry Advisory Board meeting held on 23rd March 2019 and presented the salient features which would be considered during the meeting.

Agenda 2:

Review of Syllabus of UG program

Resolution 2:

The School Head presented the curriculum changes for UG program.

Board reviewed and appreciated the Program syllabi for its flexibility with respect to student learning and enhancing employability prospects. The Mechatronics and Control Engineering courses were suggested revisions in terms of re-allotment in number of teaching hours and suitable pedagogical interventions in delivery.

The study on sensor - 1st order/2nd order/steady/transient response to be investigated in detail while electronic concepts related to interface design may be restricted to introductory level. Electro-mechanical actuators can be given more emphasis, selection of AC/DC drives, Pneumatics can be part of Control/ Mechatronics study.

Revisions were also suggested in the course on 'Finite Element Methods'. Revisions to the existing curriculum were focused on post processing techniques in software tools and data acquisition for experimental validation. To cover the case studies pertaining to industrial field issues, numerous examples were included in the curriculum. The associated lab introduced with complex engineering challenges as exercises. Further, the students were expected to publish papers on their laboratory work.

The course CAD Modelling and PLM (2-0-2) introduced with 15hr/week hands-on immersive training experience, with a focus on Exposure to system building from components/sub-systems. Emphasis on 2D, 3D drafting, generation of BOM, GD&T, exploded view and rendering features was increased. Also, included Product development and Reverse Engineering as an extension to create industry-like learning environment through virtual Projects (Mini Project).

The experts from Mathematics suggested modifications in 'Numerical Methods and Partial Differential Equation' course: Python programming was introduced as a tutorial for solving engineering problems to help students get better insight.

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The courses Machine Drawing and Manufacturing Processes II were introduced in place of Engineering Design & Product Realization which was to become the theme of Minor Project. The members approved the change.

The courses *Advanced Statistics and Machine* Learning and*Machine Learning Applications* introduced as niche verticals in view of job prospects in engineering services sector was highly appreciated and approved for implementation.

The verticals on E-Mobility elective were introduced after consultations with experts from Altair - *Vehicle Structure and Design Optimization* and *Dynamics & Durability of Vehicles*. The external members both from academia and industrywere in alignment in approving the courses for implementation as the field is upcoming both for entrepreneurship potential and employability.

Another elective course on Applications of Vibrations and acoustics was introduced after extensive interaction with M/s Josts – a leading company in the field of NVH. The BOS approved the course for implementation.

The Industry internship/project during 8th sem to ensure a longer duration Industrial contact for students leading to their employability was approved for implementation.

The scheme and curriculum from 1st sem to 8th sem for respective admission batches was approved.

Agenda 3:

Review of Syllabus of PG program

Resolution 3:

The Machine Design/Production Management/Energy Systems Engineering M.Tech. Programs were provisioned longer industry stay for students with entire 3rd sem for Industrial training/project got BOS approval.

The course Computational Methods in Engineering Analysis for MD /ESE Programmes was approved with suggestions to have concepts of statistics, probability and random events.

In Machine Design Programme, Thermal stress module has been introduced in Mechanics of solids course to focus on thermo elastic stress–strain relations of thin circular disk, long circular cylinder, and straight beams.

The Energy Systems Engineering Programme proposed a new course tilted *Economic aspects of Energy conversion* to cover economic aspects of energy conversion. The changes were approved with suggestion to give due stress on analytical aspects.

The Production Management Programme proposed a course on *Research Methodology* with orientation towards research practice covering research techniques and statistical tools. The change has been appreciated and approved by BoS members.

To enhance employment opportunities to graduating students a thorough hands-on experience on PLM/ERP tools is essential, therefore Mini Project course was introduced at the 2nd semester. The practice oriented initiative was duly appreciated and approved.

The curriculum scheme and structure from 1st sem to 4th sem for respective admission batches was approved.

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Agenda 4:

New initiatives

Resolution 4:

The initiatives to help student learn and acquire niche skill sets in *Product Lifecycle Management (PLM)* (6 credit, 2 elective, 160 hr), *Advanced CAE* (6 credit, 2 elective, 160 hrs) and minor program

– *Advanced Manufacturing for Aerospace Applications* (15 credit, 5 course, 320 hrs + Project at AEQUS campus), were three verticals that resulted in 45 student placements. *(Recruitment orders expected by last week of May 2019).*

Employment Initiatives for Production Management PG program through revamped curriculum with focus on PLM and ERP to facilitate student employability in Engineering Services Industry.

The School is working on other potential verticals for UG program in *Machine Learning*, *E-mobility* and *Digital Twin*, the detailed syllabi will be shared with BOS members through email for approval.

The collaborative efforts being made by the School with the Dassault Systems, Altair, Bosch and AEQUS in designing the niche verticals was appreciated by the members.

The new initiatives and the efforts by the faculty members were encouraged.

Agenda 5:

Status of Minor Programs

Resolution 5:

The status of all four minor programs - *Innovation and Product Development*, *Automotive Engineering*, *Bio-Engineering and Advanced Manufacturing for Aerospace Applications* was presented.

The status of Minor Programs was reviewed and endorsed by the BOS.

Agenda 6:

Student Performance

Resolution 6:

The student achievements in curricular, co-curricular and extra-curricular activities were presented. The experiential and contextualized learning opportunities created by the School in various courses helped students perform consistently in their regular academics and acquire the relevant technical and professional skills. Students' engagement in research was visible through their active participation in REU course leading to many publications, one of which has won 1st prize in an international conference. A team of students has won prestigious All India National Meritorious Invention Award for their product 'Smart FOB'under the category 'National Budding Innovators' organized by NRDC and Ministry of Science & Technology, successively second time with a prize money of Rs. 1,00,000/-. The Motor Sports club participated in SAE India E-BAJA, M-BAJA and SUPRA competitions and won no. of awards. A team ofaeroKLE – an aero modelling club participated first time in National level SAE India Aero Design Challenge 2018 competition and got All India 8th Rank.

The overall student performance in UG and PG Programmes were discussed and approved.

Agenda 7:

Review of Research progress

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Resolution 7:

The on-going research activities in the School, publication and citation details and patents filed by the faculty were discussed. The initiative at KLETU Research Centre to promote an inclusive

research through SRG, ERG and ERS group was presented with special focus on REU and REEF courses.

The members reviewed and approved the proposed initiatives with suggestion to actively continue research.

Agenda 8:

Review of OBE framework of the School

Resolution 8:

The OBE initiatives and attainment of Program Outcomes along with Program Specific Program outcomes were closely reviewed and appreciated.

The PEOs and POs were also reviewed for their relevance and approved for continuation.

Agenda 9:

Initiative for attainment of key results

Resolution 9:

The School initiatives in alignment with University guidelines to enhance operational efficiency were presented.

The four objectives and the key results (OKRs) were approved with due appreciation to the efforts made.

Agenda 10:

Any other matter with the permission of the chair

Resolution 10:

The changing placement scenario for mechanical engineering students was discussed in the backdrop of IT companies not hiring non-IT graduates from the current year. The expectation of niche skill sets by core companies has prompted the school to identify industry relevant verticals to get the students employed. In the process a dilemma in curriculum design arises that should imbibe niche skill sets without compromise on fundamental concepts. The members cited similar experiences and suggested incremental mode of growth was relevant in present context as practiced by the school. At no point of time, emphasis on fundamental core courses should be diluted, the members opined.

The board empowered the chairman to revise/modify curriculum structure and syllabus wherever required, if circumstances so demand and the same could be ratified in the next meeting.

The meeting was concluded with vote of thanks by the Chairman.

Enclosed:

1. UG Program – Structure and Syllabus
   - i. 2016 - 2020 batch
   - ii. 2017 - 2021 batch
   - iii. 2018 - 2022 batch
   - iv. 2019 - 2023 batch

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2. PG Program – Structure and Syllabus
   i. Production Management
      a. 2018 – 2020 batch
      b. 2019 – 2021 batch
   ii. Energy Systems Engineering
      a. 2018 – 2020 batch
      b. 2019 – 2021 batch
   iii. Machine Design
      a. 2018 – 2020 batch
      b. 2019 – 2021 batch

3. Minor Program
   i. Innovation and Product Development
   ii. Automotive Engineering
   iii. Bio-engineering
   iv. Advanced Manufacturing for Aerospace Applications

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Members of BOS in Mechanical Engineering

S.No.	Name	Profession	Full Postal Address	Position	Signature
1.	B B Kottursheettar	Professor & Head of the School/ Department	Professor & Head, Mechanical Engineering	Chairman	
2.	N R Banapurmath	Professor, Dean's nominee	Professor, Mechanical Engineering	Member	
3.	S B Burli	Associate Professor Dean's nominee	Associate Professor, Mechanical Engineering	Member	
4.	P M Bhovi	Assistant Professor Dean's nominee	Assistant Professor, Mechanical Engineering	Member	
5.	Dr. Nagesha N.	Subject expert from outside the college nominated by the Vice-Chancellor	Professor, Department of studies in Industrial and Production Engineering, University B D T College of Engineering, Davangere	Member	
6.	Dr. S V Prabhu	Subject expert from outside the college nominated by the Vice-Chancellor	Professor Department of Mechanical Engineering, Indian Institute of Technology, Bombay. Professor, Indian Institute of Technology, Dharwad	Member	13/4/19
7.	~~Veeresh Vastrad~~ Basharat Marikatti	Representative from industry corporate sector/ allied area relating to placement nominated by the Vice-Chancellor	Principal Engineer Quest Global, Belgaum	Member	13/04/19
8.	Dr. Prasanna G Bhat	Representative from industry corporate sector/ allied area relating to placement nominated by the Vice-Chancellor	General Manager, Powertrain Engineering, The Automotive Research Association of India, S.No. 102, Vetal Hills, Off Paud, Kothrud, Pune	Member	13/04/19

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S.No.	Name	Profession	Full Postal Address	Position	Signature
9.	S B Menon	Post-graduate meritorious alumnus nominated by the Vice-Chancellor	CEO Unique Circle Group, Pimpri Chinchwad, Pune	Member	
10.	*Student Representatives* Manjunath Hlremath Shravya M.Sanu Girish Karikatti Ashwini Hlremath Faraz Mueen Mulla Sushruth Halewadimath	Student Member representing each of the program offered by the Department/ School/ Center	*Program Details* UG UG PG-MD PG_ESE PG-PM Ph.D	Student Member	
11.	P P Revankar	ONE Senior faculty member nominated by the concerned Head of the Department/ School/ Center	Associate Professor, PG-Energy Engineering	Member Secretary	
12.	Dr. Murigendrappa	Invitee	Associate Professor, National Institute of Technology Karnataka, Surathkal	Member	
13.	Dr. Anand Ramani	Invitee	Subject Matter Expert and Head of CAE KPIT Technologies Ltd., Bangalore F-016 Gopalan Habitat Splendour Brooke fields, Kundalahalli	Memebr	
14.	Vijaykumar R	Invitee	General Manager, Mechanical Engineering Robert Bosch Engineering and Business Solutions Pvt. Ltd., Campus 1B,Ecospace, Bangalore	Member	
15.	Prof. S. Gopalakrishnan	Invitee	Assistant Professor Dept. of Mechanical Engineering Indian Institute of Technology Bombay	Member	

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S.No.	Name	Profession	Full Postal Address	Position	Signature
16.	K G Kodancha,	Invitee	Professor, PG-Machine Design	Member	
17.	V N Gaitonde	Invitee	Professor, PG-Production Management	Member	
18.	V N Sanagoudar	Invitee	Associate Professor, Mechanical Engineering	Member	

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Course Code: 19EMEC301 **Course Title: Finite Element Methods**

L-T-P : 3-0-0 Credits: 03 Contact Hrs: 3 hrs/week

ISA Marks: 50 ESA Marks: 50 Total Marks: 100

Teaching Hrs: 40 Exam Duration: 03

Unit - 1

1. Introduction to FEM: 7 hrs

FEM paradigm : History, present/future, Research, Application, stress at a point, stress components on arbitrary plane, Equilibrium equations, compatibility equations, Generalized Hook's law, Plane stress and plain strain, principle of minimum potential energy and virtual work, RR method and Galerkin's methods, FEM steps, Advantages, disadvantages and limitations.

2 Interpolation Functions For General Element Formulation : 8hrs

Discretization process, types of elements, size of elements, location of node, node numbering scheme and mesh requirements in finite element method, polynomial form of interpolation functions, convergence requirements, Pascal triangle, shape functions (1D, 2D, LST, CST, Quad, Higher order elements).

Unit - 2

3. Basic FEA analysis: 8hrs

Elimination approach, Penalty approach and Thermal effect based practical engineering problems. Multi-point constraint, Iso-parametric and Axi-symmetric elements.

4. Advanced FEA analysis: 7hrs

Practical aspects of industrial machine components, Field issues related to structural applications using higher order polynomials.

Unit - 3

4. Post processing techniques: 5hrs

Validate and interpret the results, Average and Un-average stresses, Special tricks for post processing, Design modification, CAE Reports

5. Experimental Validation and Data Acquisition: 5hrs

Strain gauge, Photo elasticity, Load cells, Torque Sensors/Transducers, Dynamic tests, Acceleration test, Fatigue life measurement, Natural Frequency measurements.

Text Book

4. K. H. Huebner, D. L. Dewhirst, D. E. Smith and T. G. Byrom, The Finite Element Method for Engineers, 4th edition, Wiley, New York, 2001.
5. T. R. Chandraputala and A. D. Belegundu, Introduction to Finite Elements in Engineering, Third Edition, Prentice Hall of India, 2004.
6. Nitin Ghokale, Practical finite element analysis, Finite to infinite, 2008.

References

1. N. S. Ottosen and H. Petersson. Introduction to the Finite Element Method, Prentice-Hall, Englewood Cliffs, 1992.
2. S. S. Rao, Finite Element Method in Engineering , Fourth Edition, Elsevier Publishing, 2007.