CRITERIA 1	Vision, Mission and Program Educational Objectives

Vision, Mission and Program Educational Objectives

1.1 Vision and Mission

(Vision statement typically indicates aspirations and Mission statement states the broad approach to achieve aspirations) (Here Institute Vision and Mission statements have been asked to ensure consistency with the department Vision and Mission statements; the assessment of the Institute Vision and Mission will be taken up in Criterion 10)

***VISION AND MISSION OF THE INSTITUTE*:**

Vision

Engineering the future of the nation by transforming the students to be technically skilled managers, innovative leaders and environmentally receptive citizens

Mission

1. To implement holistic approach in curriculum and pedagogy through Industry Integrated Interactions to meet the needs of Global Engineering Environment.
2. To develop students with knowledge, attitude and skill of employability, entrepreneurship (Be Job creators than job seekers), research potential and professionally ethical citizens.

VISION AND MISSION OF THE MECHANICAL ENGINEERING DEPARTMENT

Vision

To create a center of global standard for imparting education in Mechanical Engineering field and conducting research at the cutting edge of technology to meet the current and future challenges of technological development to be managers & leaders with innovative thought to improve the eco-system.

Mission

To build enabling environment for excellent teaching, learning and research in order to produce entrepreneurs and innovators in the field of Mechanical Engineering for sustainable improvement.

1.2 State the Program Educational Objective (PEO's) (5)

The Program Educational Objectives (PEOs) support and are in consonance with the Mission of the Institution and the department. The attempt was to define PEOs as broad based, general statements that describe the career and professional accomplishments that the mechanical engineering program is preparing our graduates to achieve.

PEO-1- KNOWLEDGE

Mechanical Graduates will have strong fundamental technical knowledge and are capable to develop core competency in diversified areas such as Production, Design, Thermal, Industrial and allied fields with the use of software tools to expand their knowledge horizon and inculcate lifelong learning.

PEO-2- SKILLS

Graduates will have effective communication, leadership, team building, problem solving, decision making skills, and software and creative skills by understanding contemporary issues there by contributing to their overall personality and career development.

PEO-3- ATTITUDE

Graduates will practice ethical responsibilities and service towards their peers, employers, society and follow these precepts in their daily life.

1.3 Indicate how and where the Mission and Vision are published and disseminated among stake holder (10)

(Describe where (websites, curricula, posters etc.) the Vision, Mission and PEOs are published and detail the process which ensures awareness among internal and external stakeholders with effective

process implementation) (Internal stakeholders may include Management, Governing Board Members, faculties; support staff, students etc. and external stakeholders may include employers, industry, alumni, funding agencies, etc.)

The Program Educational Objectives are published

	Internal Stake Holders	**External Stake Holders**
Departmental Newsletter	✓	
College Website (www.acsce.edu.in)	✓	✓
Department website	✓	✓
Placement brochure	✓	✓

The Program Educational Objectives are disseminated

	Internal Stake Holders	**External Stake Holders**
Faculty rooms	✓	
Class rooms	✓	✓
Laboratories	✓	✓
Departmental corridors	✓	
Seminar Hall	✓	✓

NOTE:

Internal Stake Holders

1. Management- (MCET/ Governing Council Members)
2. Faculties
3. Non-Teaching Staff

4. Students

External Stake Holders

1. Parents
2. Employers
3. Industries
4. Alumni

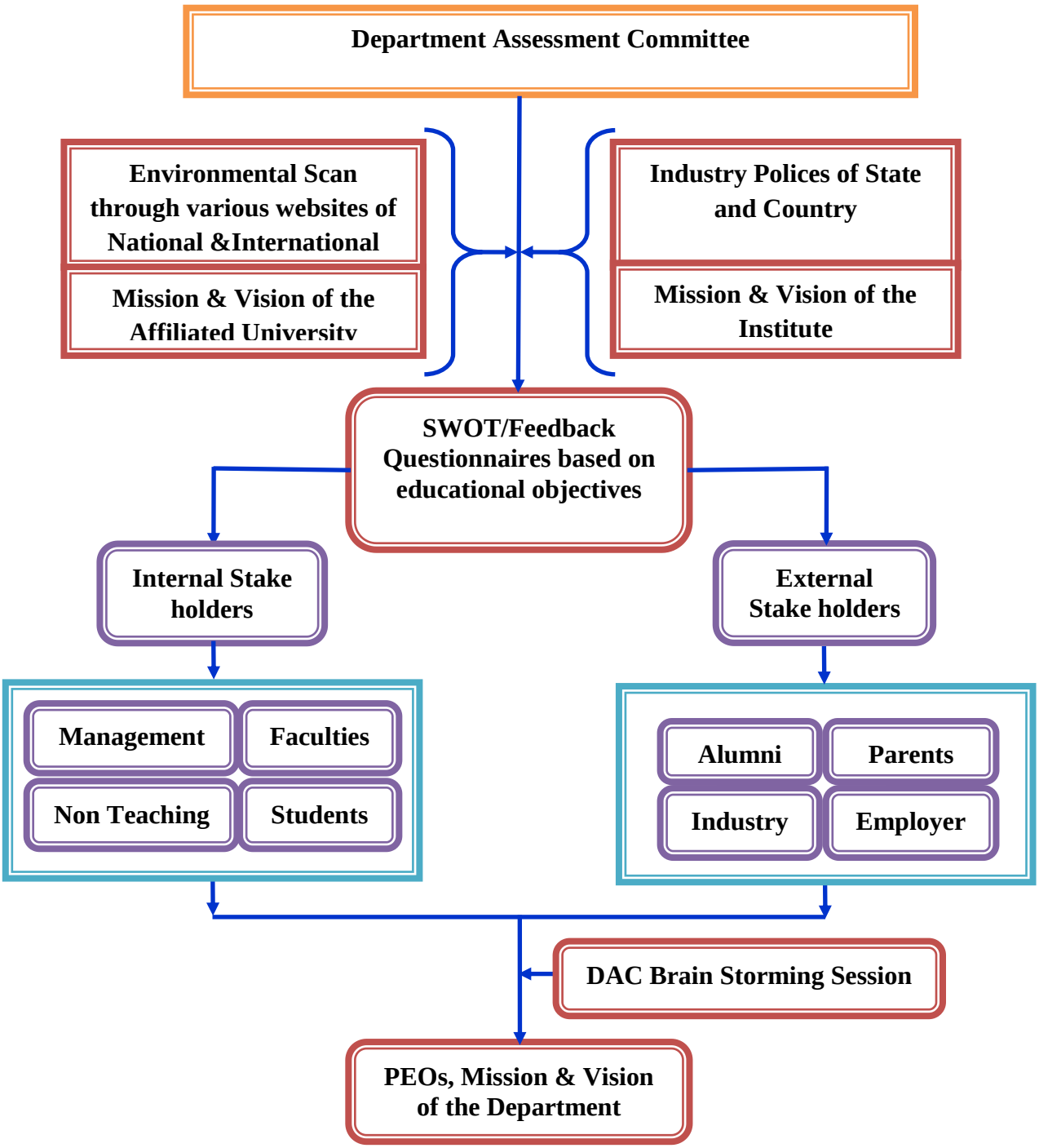
1.4 State the process for defining the Vision and Mission of the Department, and PEOs of the program (25)

The Vision and Mission Statements were defined by involving the stakeholders of the department, considering the institutional Mission & Vision, the environmental scan and future of the country and global projections in the field of **Mechanical Engineering** and allied fields. Following process was adopted in developing Departmental Mission and Vision statements:

Departmental Assessment Committee (DAC) conducted SWOT analysis to ascertain its Strengths, Weaknesses, Opportunities and Threats. This was conducted covering all internal stakeholders including management and alumni. DAC conducted detailed environmental scan through various internet (National and International) sites. DAC also studied the industrial policies of the state and the country and man power projections stipulated in various documents of Planning Commission and AICTE.

DAC also considered the Institutional Mission & Vision and that of the affiliating university to ensure consonance. DAC with focus group discussion came up with questionnaires' based on SWOT and using rubrics collected the feedbacks from all the stake holders.

Once all the information was collected and summarized, DAC members had a brainstorming session to finalize the PEOs, Mission and Vision of the department.



1.5. Establish consistency of PEOs with Mission of the Department (15)

(Generate a "Mission of the Department – PEOs matrix" with justification and rationale of the mapping) By mapping mission with the program objectives we can show the consistency.

Department Mission Key Components		PEOs		
		PEO-1	PEO-2	PEO-3
M1	Emphasizing on fundamentals	3	1	2
M2	Advances in technologies	3	2	2
M3	Problem solving.	2	3	2
M4	Creative & software skills.	1	3	2
M5	Life-long learning.	2	1	3
M6	To function as social and ethical professionals in the society	-	-	3

Program Educational Objective - 1

PEO is consistent with the mission component -1 and 2 of meeting high standards of student by emphasizing on knowledge of fundamentals & advances in technologies.

Program Educational Objective - 2

PEO is consistent with the mission component -3 and 4 of providing success through various skills like decision making, software and creative skills.

Program Educational Objective - 3

PEO is consistent with the mission component -5 and 6 of producing graduates with attitude that are prepared for advanced education and life-long learning and therefore capable of engaging in the process of research and scientific discovery for the benefit of society.

CRITERIA 2	Program Curriculum and Teaching – Learning Processes	120

2. PROGRAM CURRICULUM AND TEACHING - LEARNING PROCESSES (120)

2.1. Program Curriculum (20)

State the process used to identify extent of compliance of the University curriculum for attaining the Program Outcomes and Program Specific Outcomes as mentioned in Annexure I. Also mention the identified curricular gaps, if any (10)

(State the process details; also mention identified curricular gaps).

***Note:** In case all POs are being demonstrably met through University Curriculum then 2.1.2 will not be applicable and the weight age of 2.1.1 will be 20.*

Program Outcomes:

1. Demonstrate knowledge of mathematics such as multi-variable calculus, Differential equations, science and engineering.
2. Demonstrate an ability to identify, formulate and solve mechanical engineering problems.
3. Model, analyze, design and realize physical systems, components or processes.
4. Plan and conduct an experimental program and evaluate the results.
5. Use modern engineering tools, software and equipment to analyze problems.
6. Understand the global, societal context of engineering.
7. Provide mechanical engineering solutions to green and sustainable development.
8. Demonstrate knowledge of professional and ethical responsibilities.
9. Work with others to accomplish common goals.
10. Communicate effectively in both verbal and written form
11. Develop confidence for self-education and ability for life-long learning.
12. Complete a project with financial management skill.

PSO-Program Specific Objectives

1. Graduates will demonstrate the knowledge of applied mathematics and advanced software tools for design specification, development such as fabrication, analysis such as testing and operation of the physical systems, components and processes involved in mechanical engineering.

2. Graduates will demonstrate the knowledge, skill and attitude to analyze the cause and effects on machine elements, processes and systems.

Courses are analysed for the curriculum gaps using the following processes:

- Input from the Teacher handling the Course.
- Input from Industry Experts/ Employers.
- Based on the feedback from placement cell.
- Based on Alumni feedback.
- Based on management feedback.

This college is affiliated under Visvesvaraya Technological University, Belgaum. Mechanical Engineering programme curriculum is as per the scheme and syllabus of affiliated university. In general, Curriculum maintains the balance in the composition of Basic Science & Engineering, Humanities, Professional Courses and their distribution in Core and Electives along with Seminars & Project works. The feedback from the Alumni's and Industry experts were taken with at most importance and GAP's were identified along with the data collected from Internet (National & International websites), other universities which are located in and around Karnataka. The data collected was then presented in front of the Department Core Committee. The committee illustrates the same to the Institutional core committee at institute level and syllabus beyond content framed. If some components, to attain CO's/ PO's, are not included in the curriculum provided by the affiliated university then the Institution makes additional efforts to impart such knowledge by covering aspects through **"BEYOND SYLLABUS CONTENTS"**. We add content beyond syllabus by proper

Fig.1“GAP Analysis” process shown in Figure 2.1 and Figure 2.2 shows process used to identify the curricular gaps to attainment of the Cos/Pos.

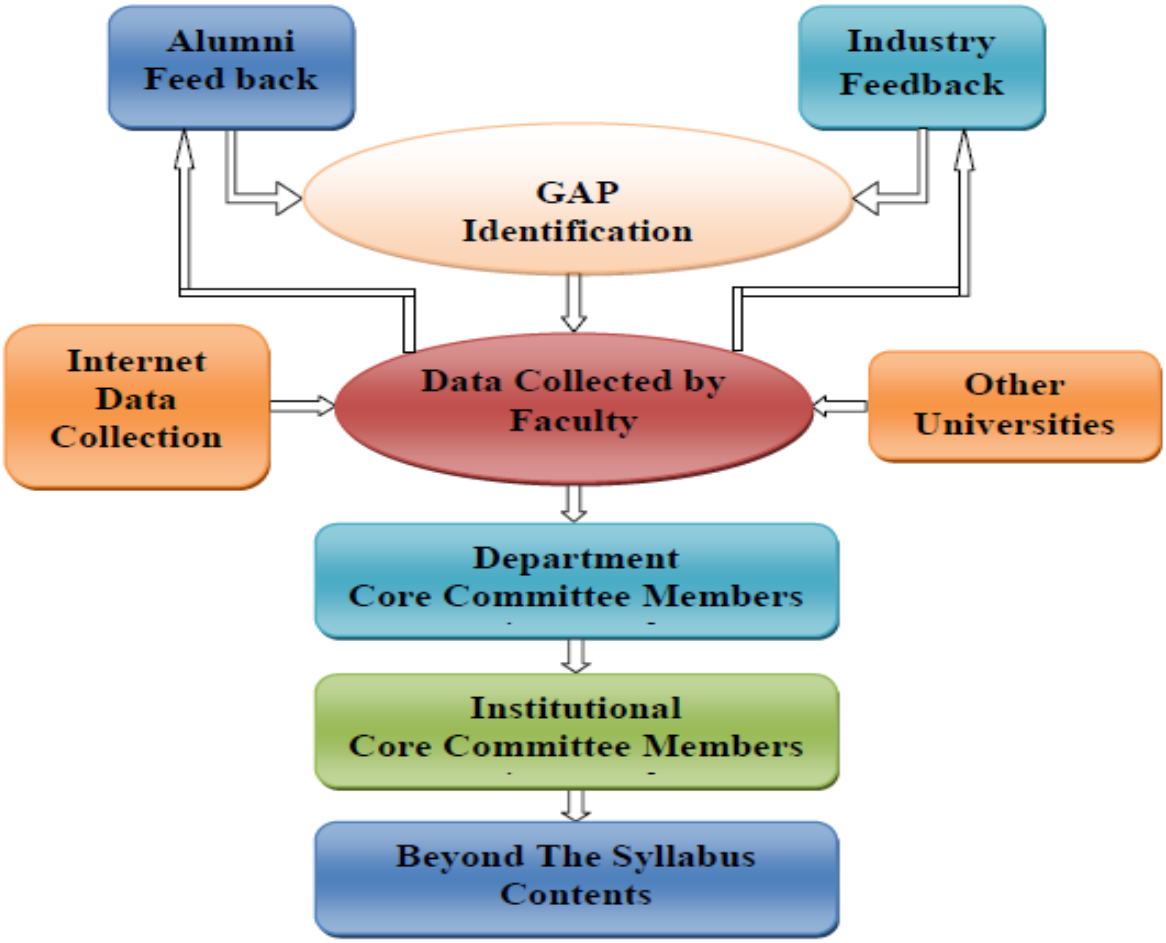


Fig.2.1 GAP Analysis

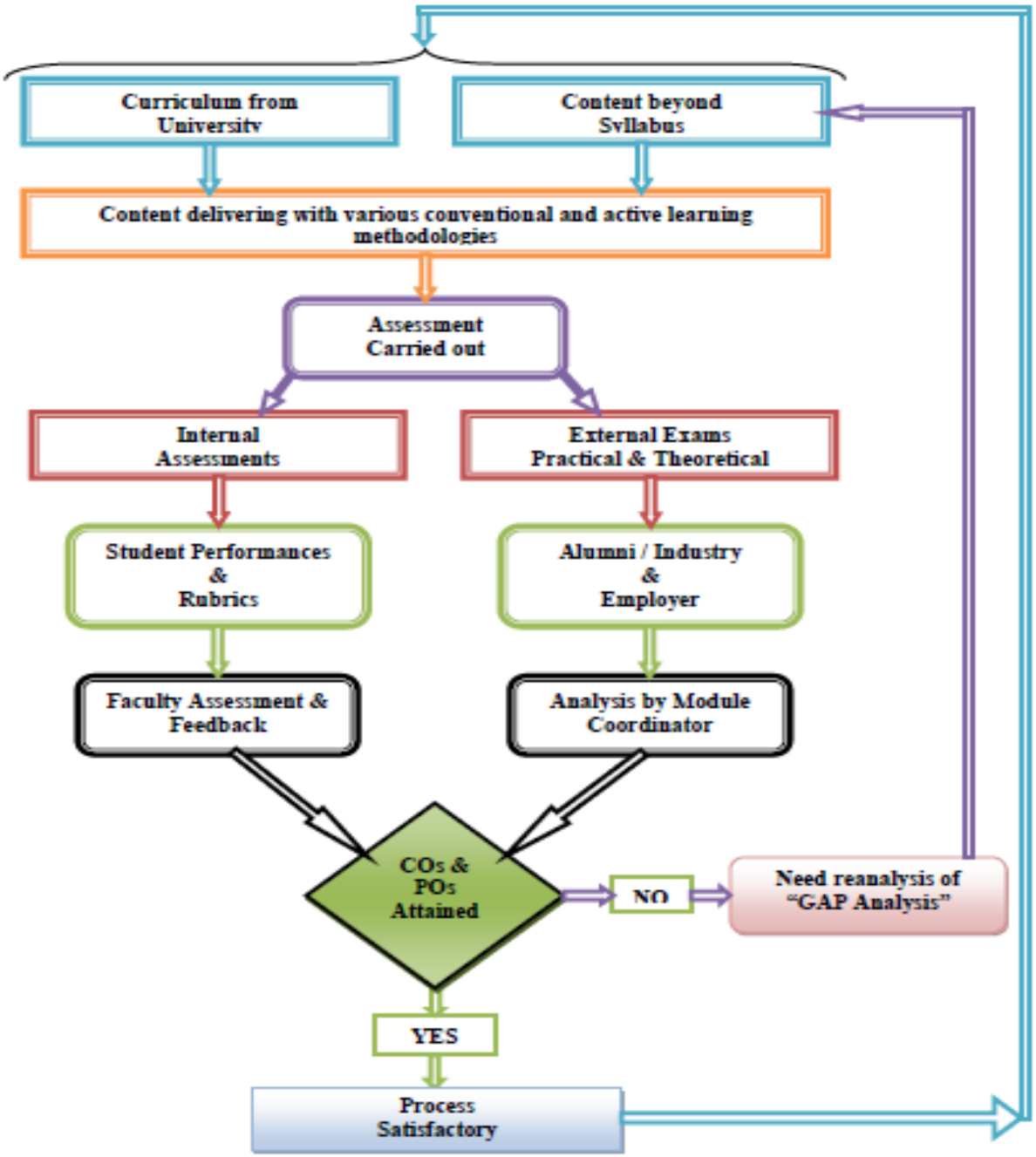


Figure 2.2 Process Used To Identify The Curricular Gaps To Attainment Of The Cos/Pos.

2.1.2. State the delivery details of the content beyond the syllabus for the attainment of Pos and

PSOs (10)

Sl.	Indentified Gap	Action	Date-	Resource	%of	Relevance

(Provide details of the additional course/learning material/content/laboratory experiments/projects etc., arising from the gaps identified in 2.1.1 in a tabular form in the format given below)

No		taken	Month-Year	Person with designation	students	to POs, PSOs
1.	Imagine, Inspire and Innovate -innovations in engineering how to apply the basic concepts from theory.CAD/CAE/CAM simulation used in design the Applications	Guest Lecture	27/02/2015	Dr.C.B. VijayaVittala, Professor & Head (R& D), HMSIT, Tumkur.	100% Third year students	PO'S = 1, 2, PSO'S= 1, 2
2.	To enhance the knowledge of faculty in usage of tools other than specified in the Curriculum. How Engineers are Sustainable in Product Design and Manufacturing	Faculty Development Program	22nd to 25th June 2015	Table:2.1.2a	100% (All Faculty Members) 40 percipients from the all over Karnataka	PO'S = 2,3,4,5,6,8, 9,10,12,13 PSO'S= 1, 2
3.	In energy engineering how the Biodiesel development and characterization concept used and get practical knowledge to students.	Guest Lecture	01/10/2015	Dr. M C. Math, VTU, PG Centre, Mysuru	100% Third year students	PO'S = 1, 2, PSO'S= 1, 2
4.	To get the knowledge of the materials application and how the composite materials used in practical applications for the second year students.- Environmental friendly composites and their applications	Guest Lecture	31/10/2015	Dr.L.Boopathi Principal, Erode Sengunthar Engineering College, Erode	100% Second year students	PO'S = 1, 2, PSO'S= 1, 2
5.	Career opportunities, job market scenario with skill set expected from company HRs while hiring, students Finite element method knowledge with practical applications.	Guest Lecture	06/09/2014	Prof. GuntiRanga Srinivas, (CPDM), IISc,B.lore	100% Final year students	PO'S = 1,2,3 PSO'S= 2

Delivery details of the content beyond the syllabus for the academic year 2014-15

Table: 2.1.2a

Sl. No.	Resource Person With Designation
1.	Dr.S.N.Sridhar, Executive council member,VTU,Principal,KSSEM,Bangalore
2.	Dr.VijayaVittala, Professor,R&D Head, HMSIT, Tumkur
3.	Dr.NarendraViswanath,Principal,GAT,Bangalore
4.	Dr.R.P.Swamy,Professor,UBDTCE,Davangere
5.	Dr.SureshBhemappa,Professor,NIE,Mysore
6.	Dr.Anantharaj,Executivesecretary,VGST,Government of Karnataka
7.	Dr.Suresh.R,AllianceUniversity,Bangalore
8.	Dr.Vijaya Kumar,Professor,JSSATE,Bangalore
9.	Dr.C.K.Srinivas,HOD – Additive Manufacturing,CMTI,Bangalore
10.	Dr.Srinivas,Professor,UBDTCE,Davangere
11.	Dr.N.D.Shivakumar,Professor,IISc,Bangalore
12.	Dr.S.B.Mallur, Special Officer, VTU,Bangalore Region

CERTIFICATE

Prof./Dr./Mr./ Mrs./----------

s an employee of our institute and his/her application is hereby endorsed. The applicant will be permitted to attend the VTU-VGST sponsored FDP on **"SUSTAINABLE PRODUCT DESIGN AND MANUFACTURING"** will be held at ACS College of Engineering, Bengaluru during 22nd - 25th June 2015, if selected.

Date: Signature of Head of the institution
Official Seal:

ADDRESS FOR CORRESPONDENCE
Dr. Raju .B .R.
Coordinator, VTU-VGST FDP SPDM-2015
Department of Mechanical Engineering
ACS College of Engineering
Kambipura, Mysuru Road,
Bengaluru- 560074, Karnataka, India
Mobile : 9448373636/8762085909
Ph. :+91-080-28437855/955
Fax :+91-080-28437989
Emaill : rajusrujan@gmail.com

IMPORTANT DATES
Last date of receipt of applications: 15-06-2015
Intimation of selection by e-mail : 18-06-2015
FDP Duration: 22nd-25th June 2015.

HOW TO APPLY
The course is primarily open to faculties of Engineering & Polytechnic Institutes. Those who are interested in attending the course are requested to complete the enclosed registration form & send to the address for correspondence (by electronic e-mail). The seats are limited to 30 & preference will be given first come & first serve basis.

ACCOMMODATION

For the entire period of the course, the participants from the AICTE approved institutions will be provided accommodation in students hostels of ACS College of Engineering, Bengaluru.

FINANCIAL ASSISTANCE

Travelling allowance, lodging and boarding will be provided as per VTU-VGST norms (either second class sleeper by train or shortest route by bus).

COURSE MATERIAL

Each registered participant will be provided with a set of comprehensive lecture notes.

RESOURCE PERSONS

Dr. S. B. Mallur, Special Officer, VTU, Bengaluru
Sri. D. R. Kumar, Managing Director,
M/s, Skanda M/c Tools Pvt. Ltd, Bengaluru
Sri. S. Pradeep Kumar, Kennametal, Bengaluru
Dr. N. D. Shivakumar, CPDM, IISc, Bengaluru
Dr. S. Seetharamu, Director, CPRI, Bengaluru
Dr. C. K. Srinivas, HOD-AM, CMTI, Bengaluru
Dr. Narendra Viswanath, Principal GAT,
Bengaluru
Dr. Manjunatha, Principal, NHCE, Bengaluru
Dr. B. Surosha, Professor, NIE, Mysuru
Dr. R. P. Swamy, Professor, UBDTCE, Davangere
Dr. L. S. Prathasarathi, IGCAR, Kalpakkam
Dr. C.B Vijaya Vittala, R&D Head, HMSIT Tumkur
Dr. M. Vijayakumar, Professor, JSSATE, Bengaluru

VTU-VGST SPONSORED FACULTY DEVELOPMENT PROGRAMME ON
"SUSTAINABLE PRODUCT DESIGN AND MANUFACTURING"
June 22nd - 25th, 2015

SPONSORED BY
VISVESVARAYA TECHNOLOGICAL UNIVERSITY,
BELAGAVI
&
VISION GROUP ON SCIENCE AND TECHNOLOGY (VGST)
(Government of Karnataka)

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DEPT. OF MECHANICAL ENGINEERING
ACS COLLEGE OF ENGINEERING
MYSORE ROAD, BENGALURU-560074
KARNATAKA
(www.acsce.edu.in)

\VGST –BROCHURE

During Inaugural of the VGST-FDP on 22nd June 2015

Dr Anantha Raj, Executive Secretary , VGST, GoK as honoured by our beloved Executive Director, RRGI, Shri S. Vijayand, on 24th June 2015.

HAL –Helicopter Division Industrial Visit with VGST-FDP percipients on 24th June 2015

Best projects-2013-2014

Sl. No.	Name of the Mentor	Title	Name of the students	USN
2	Mr.H.S.Siddesha	Experimental and computational simulation of producing Ultra-fine grained Aluminum silicon carbide composites processed by constrained groove pressing	Mamatha R	1AH10ME024
			Punith H B	1AH11ME412
			Pradeep M S	1AH10ME033
			Nagaraju K L	1AH11ME409
		Automatic Speed control and detection of gas leakage of vehicle using Eye Blink Sensor and Gas sensor	Ramesh H S	1AH10ME038
			Arun kumar S	1AH11ME401
			Sunil V	1AH10ME048
3	Mr Girisha.C	Mechanical properties evaluation of Natural fibers reinforced Bio-Composites and fabrication of a Telephone stand.	Thejesh C S	1AH10ME050
			Chethan kumar	1AH10ME014
			Nandeesh	1AH10ME027
			Somashekar V	1AH10ME044
		Mechanical and Thermal properties of Nano-Clay dispersed biodegradable polymer Nano-composites for the packaging applications.	Srinivas C	1AH11ME420
			Rakashith V	1AH11ME413
			Naveena M	1AH11ME410
			Mahantesh	1AH11ME408

Best projects-2014-2015

Sl. No.	Name of the Mentor	Title	Name of the students	USN
1.	Dr.M.Eswaramoorthy	Performance Enhancement of Photovoltaic cell using phase Change material.	Kiranachari D K	1AH12ME411
			Madhu K R	1AH12ME414
			Nagraj K	1AH12ME418
			Jagadish S H	1AH12ME408
2	Prof. H.S.Siddesha	Experimental and computational simulation of producing ultrafine grain Size in aluminum sheet by severe plastic deformation	Amruthnaryana	1AH11ME002
			Bhanuprakash	1AH12ME401
			Siddesh S.	1AH11ME013
			Vijay M	1AH11ME015
3	Dr.Raju.B.R	Investigations on the influence of micro fillers on three-body abrasive wear behavior of glass fabire reinforced epoxy composites.	Vinay C	1AH11ME016
			Chandana Y J	1AH12ME403
			Lokesh K	1AH12ME423
			Vinodh N	1AH12ME433
4		Biogas production from paper waste	Venugopal	1AH10ME053

	Prof.Sivasubramaniam	blend with cow Dung	Srikanth Bhatt	1AH10ME046
			Jayaraj	1AH11ME406
			Basavaraj	1AH11ME402
5	Prof. Girisha.C	Bio-Composites Bumper for automobile	Dileepkumar G	1AH11ME006
			Sachin S Nayak	1AH11ME011
			Vijay SY	1AH12ME432
			Prabhu Satyam	1AH10ME032

Best projects-2015-2016

Sl. No.	Name of the Mentor	Title	Name of the students	USN
1.	Dr.M.Eswaramoorthy	Experimental Evaluation of Solar Photovoltaic-Thermoelectric with Latent Heat Effect	Moizpasha Patel	1AH12ME026
			Shamanth kumar	1AH12ME041
			Rajesh Kumar	1AH12ME034
2	Prof.Chandrakala	Design, Development and Experimental Evaluation of Hybrid Fresnel Using Lens Solar Stove	Aruna	1AH11ME003
			Deepak. M	1AH11ME005
			Shashikumar.	1AH11ME012
			Aditya Mahesh.	1AH11ME001
3	Prof.Sivasubramaniam Prof. P.Shivashankar	Solar Powered Thermoelectric Refrigeration System	Deepak Nayaka	1AH12ME009
			Dilip Kumar N	1AH12ME010
			Harsha H	1AH12ME014
			Karthik S Gowda	1AH12ME017
4	Prof.Sunilraj.B.A	Bio-Design And Fabrication Of Bio-composite Helmet	Bharath B	1AH13ME404
			Chethan Kumar G	1AH13ME406
			Shivanna G	1AH13ME417
			Syed Sajjad Hussain	1AH13ME418

PLACEMENTS:

Seven students of the **Final year Mechanical Engineering** have been selected for **MERCHANT NAVY**.

Sl.No	USN	Name
1	1AH12ME413	Lokesh.K
2	1AH12ME402	Bharatesh.B.H
3	1AH11ME002	Amruthnarayana
4	1AH12ME418	Nagaraj.K
5	1AH12ME433	Vinod.N
6	1AH12ME432	Vijay.S.Y
7	1AH11ME017	Vinay.C

STUDENTS ACTIVITIES & ACHIEVEMENTS

The Project entitled **"MECHANICAL AND THERMAL PROPERTIES OF NANOCALY DISPERSED BIODEGRADABLE POLYMER NANOCOMPOSITES FOR THE DACKAGING APPLICATIONS"** won the **First place in the Mechanical Engineering Stream at a State levelProject Exhibition/Competition TECHNODEA -2014 held at SSIT, Tumkur**. 8th Sem Mechanical Eng. Students Rakshith, Srinivas, Naveen Kumar, Mahantesh. Guided by Prof. Girisha C and Dr. Vishnu Mahesh .K.R

8th Sem Mechanical Eng. Students Rakshith, Srinivas, Naveen Kumar, Mahantesh. With Guides Prof. Girisha C and Dr. Vishnu Mahesh .K.R

Shamanth Kumar of VI Sem, Mechanical Engineering Secured First Place in CADD MODELLING at a National Level Technical Symposia, held at NIE, Mysore, on 10th and 11th April 2015.

Shamanth Kumar of VI Sem, Mechanical Engineering Secured First Place in CADD MODELLING at a State level Fest, held at Cambridge University, Bangalore.
Shamanth Kumar of VI Sem, Mechanical Engineering Secured First Place in SKETCHING at a State level Fest, held at New Horizon College of Engineering, Bangalore.

Suhas.V of IV semester Mechanical Engineering participated in the State level Project Exhibition conducted at Dr. AIT, Bangalore.


Suhas. V and Tejesh Kumar of IV semester Mechanical Engineering secured Second place in Paper Presentation competition at a National Conference held at Jyothy Institute of Technology, Bangalore.

The students of mechanical engineering has participated in the inter-college and intra-college competitions and received the prizes. Mr K.R. Shamanthkumar of Mechanical Engineering has got the prize from his career

INTER COLLEGE ACHIEVEMENT LIST

Sl. No.	EVENT TITLE	COLLEGE	DATE	PRIZE
1	THEME BASED PAINTING	DON BOSCO INSTITUTE OF TECHNOLOGY, BENGALURU	29,30 APRIL, 2014	2ND PLACE CASH AWARD
2	CAD 3D	CHRIST	20 FEBRUARY	1ST PLACE

	MODELLING	UNIVERRSITY,BENGALURU	2015	CASH AAWARD
3	CAD 3D MODELLING	NATIONAL INSTITUTE OF ENGINEERING, MYSURU	10,11 APRIL 2015	1ST PLACE CASH AWARD
4	PENCIL SKETCHING (TECHNICAL)	NEW HORIZON COLLGE OF ENGINEERING, BNGALURU	23APRIL, 2015	1ST PLACE CASH AWARD
5	QUIZ COMPITETON	IISc, BENGALURU	23 SEPTEMBER 2015	PARTICIPATED
6	CAD 3D MODELLING	CHRIST UNIVERRSITY,BENGALURU	27 FEBRUARY 2015	2ST PLACE CASH AAWARD
7	INTERNATIONAL CONFERENCE	KONGU COLLEGE OF ENGINEERING, TAMILNADU	18,19 MARCH 2016	JOURNAL PUBLISHED – IJAER
8	MOTOROLA PROJECT AWARD	M.S.RAMAIAH INSTITUTE OF TECHNOLOGY	16 JUNE, 2016	PROJECT SPONSORSHIP AND APPRECIATION AWARD
9	PENCIL SKETCHING (TECHNICAL EVENT)	ACS COLLEGE OF ENGINEERING (AERONAUTICAL ENGINEERING)	14 OCTOBER, 2015	2ND PLACE CASH AWARD

The following tables mentioned is illustrates the delivery of the course content beyond the syllabus imparted for the attainment of COs and POs to bridge curricular gaps.

1. Library/Internet assignments on contemporary issues.

2. Pre-placement Training

3. Training on Soft skills and value added programs

4. Creative /Projects

5. Guest Lectures

6. Workshops / Conferences / Technical Seminars

7. Industrial Visits and Internship

CAY

Events Conducted				
Sl. No	**Event**	**Topic**	**Date**	**Resource Persons**
1.	**Technical Talk**	Biodiesel development and characterization	01/10/2015	**Dr.Mallikarjunayya C. Math**, Associate Professor Department of Thermal Power Engineering ,VTU, PG Centre, Mysuru
2.	**Technical Talk**	Environmental friendly composites and their applications	31/10/2015	**Dr.L.Boopathi** Principal, Erode Sengunthar Engineering College,Erode
3.	**One day National workshop**	Intellectual Property Rights	17/11/2015	Mr. Pradeep, KSCST, Patent Information Center, IISC campus, Bangalore
4.	**One day International workshop**	High Impact Factor Journal Preparation & Funding Research Proposal	07/01/2016	**Dr. S Arunachalam,** Senior Lecturer, School of Architecture, Computing and Engineering, University of East London, UK.
5.	**Entrepreneurship**	Entrepreneurship Awareness Camp	18/02/2016 to 20/02/2016	Students are exposed to different aspects of entrepreneurship, including opportunity guidance, services offered by agencies of support system etc.
6.	Two Days National Workshop	Challenges and Opportunities on Renewable Energy Conversion Technologies"	25/02/2016 To 26/02/2016	The various challenges and opportunities in renewable energy conversion technologies were discussed and interacted by the different academic research experts.
7.	One day workshop	**ROLE OF INDUSTRY & INSTITUTE INTERACTION**	31/03/2016	**Dr. Seetharamu S,** Director (Retd.), Central Power Research Institute (Ministry of Power, GoI) **Dr. Shanmukha N**, Professor, R.V. College of Engineering
6.	**Technical Talk**	"Design, Selection of Materials & Processing: In Aerospace	02/04/2016	**Mr.Madeva Nagaral,** Design Engineer, HAL,ARDC Bangalore

CAY m1

Events Conducted				
Sl. No	**Event**	**Topic**	**Date**	**Resource Persons**
1.	**Technical Talk**	Applied Finite Element Analysis in Automotive, Aerospace and Biomedical Engineering.	06/09/2014	**Prof. GuntiRangaSrinivas,** Center for Product Design and Manufacturing (CPDM), Indian Institute of Science, Bangalore
2.	**Technical Talk**	Severe Plastic Deformation and its applications	13/11/2014	**Mr.Siddesh.H.S** Asso.professor ACSCE,Bangalore
3.	**Technical Talk**	Imagine, Inspire and Innovate (innovations in engineering)	08/03/2015	**Dr.C.B. VijayaVittala,** Professor and Head (R & D), HMSIT, Tumkur.
4.	**Faculty Development Program**	Sustainable Product Design and Manufacturing	22/06/2015 to 25/06/2015	Exports from various Reputed Engineering college principals, Professors and industrialists.

CAY m2

Events Conducted				
Sl. No.	**Event**	**Topic**	**Date**	**Resource Persons**
1.	**Technical Talk**	Project Methodologies	17/02/2013	**Dr.D.K.Ramesh,** Professor, Mechanical Engg.Department, UVCE,Bangalore
2.	**Technical Talk**	Finite element methods and its applications	08/03/2013	**Mr.GangaReddy**Senior Manager, HCL Technologies, Bangalore
3.	**National level symposium**	National level students technical symposium	10/05/2013	**Dr.M.Shantharaja** Asso.Professor, Mechanical Engg.Department, UVCE,Bangalore

2.2. Teaching - Learning Processes (100)

2.2.1. Describe Processes followed to improve quality of Teaching & Learning (25)
(Processes may include adherence to academic calendar and improving instruction methods usingpedagogical initiatives such as real world examples, collaborative learning, quality of laboratoryexperience with regard to conducting experiments, recording observations, analysis of data etc. Encouraging bright students, assisting weak students etc. The implementation details and imDACt
Analysisneeds to be documented)

- **Adherence to Academic calendar**
    - **Maintenance of Course files:**
        - Time Table and Calendar of Events
        - The course objectives are defined for each course in line with the POs.
        - Lesson plan
    - **Question Bank**
    - **Assignment**
- **Use of Various instructional methods and pedagogical initiatives**
- **To support weak students and encourage bright students:**
- **Quality of classroom teaching**
- **Conduct of Experiments**
- **Continuous Assessment in laboratory**
- **Student feedback of teaching learning process and actions taken**

As per the university guidelines 10-12 experiments are to be conducted. However for the relevant courses, provision is made to conduct 1 or 2 experiments beyond the specified list, but within the scope of the course. Laboratory manual explaining the details of the experiment is available with the course teacher and is supplied to the students during the laboratory schedule. This guides the students to understand and perform the experiment easily.

To meet the current requirements of the industry, the below content beyond syllabi were formulated with the following POs:

2 Manufacturability

3 Safety

4 To identify, formulate and solve Engineering problems

5 To use the techniques, skills and modern engineering tools necessary for engineering practice

6 For the Engineering students, Project experiences allow them to carry out in-depth study of engineering concepts, while emphasizing hands-on experiences and practical applications.

7 Participating in projects strengthens the student's resume, and fulfills the requirements of present day employers, who demand sound engineering skills in their employees.

8 Student participation in all these projects included literature research, circuit design, computer programming, laboratory set-up, and data measurement and analysis.

9 Our experiences show that, with a little guidance from the faculty, undergraduate students can be good researches. To the students, the in DAC of undergraduate research experiences is measurable in several dimensions. The research experiences provide them exposure to the modern technology and equipment.

10 The one-to-one discussions and communication between professors and the students has increased confidence levels of the students. They also g a in valuable technical knowledge by conducting literature search, industry visits and discussions with engineers and other technical professionals.

11 Through the experiences of independent research, students are better prepared in the areas of critical thinking and life-long learning. This encourages the students to pursue graduate studies.

12 Consequently, it greatly increases their potential for employment. This may add the depth to the experiment as students could work in teams on collaborative

13 Cooperative learning.

Mechanical Engineering Program follows the curriculum prescribed by the Visvesvaraya Technological University, Belgaum.

1) Program is spread over 08 semesters.

2) Minimum of 85% attendance is mandatory to get eligibility to attend practical & theory examinations along with a provision of condo nation of 10% of the attendance by the Vice-Chancellor on the specific recommendation of the principal of the college.

3) There shall be maximum of 25 Internal Assessment Marks in each theory subject or practical papers.

4) Three Internal Tests are offered to the student, after evaluating average marks of best two tests will be considered for Internal Assessment Marks for the each subject.

5) A candidate failing to secure a minimum of 50% of the IA marks in practical/project work shall not be eligible for the practical/project in the university.

6) Candidates shall carry forward maximum of 4 subjects form either 1st or 2nd semester to get admission to 3rd semester, and to get admission for 5th semester he/she can carry forward maximum of 4 subjects form either 3rd or 4th semester & should have passed in all the subjects of 1st& 2nd Semesters. Similarly maximum of 4 subjects can be carried forward form 5th&6th semester to get admission to 7th semester and should have cleared all the subjects from 1st to 4th semester.

7) For a pass in a theory subject/drawing, the candidate shall secure minimum of 35% of the maximum marks prescribed in the university examination & 40% of marks in the aggregate inclusive of the IA marks. Also for practical/project/viva-voce examination, a candidate shall secure a minimum of 40% of the maximum marks prescribed by the university.

8) A candidate shall take one elective in 6th semester from 'Group-A', two electives in 7th semester (one each from Groups 'B', 'C') & two electives in 8th semester (one each from Groups 'D' & 'E'). There shall be a minimum of 3 electives are to be listed in every group.

Program specific Criteria for Mechanical Engineering are specified by Visvesvaraya Technological University, American Society for Mechanical Engineers (ASME) and Indian Society of Mechanical Engineers (ISME). Though some of the curricular requirements of the professional body are not included in the university curriculum, the department has included these as content beyond syllabus.

Program specific criteria and their associated subjects are

A. Humanity Sciences:

Basic Sciences Subjects from engineering chemistry, engineering physics, engineering physics lab, engineering chemistry lab are studied to understand & strengthen the fundamental of basic sciences that are implemented to solve the engineering problems. **Mathematics** This subject becomes the base for all the subjects where mathematical equations are made use. The course include probability and statistics, including applications appropriate to the program through differential and integral calculus, differential equations, linear algebra, complex variables, and discrete mathematics, etc. Subjects cover the following topics under this session are: Engineering Mathematics – I, II, III &IV Diploma Mathematics for 3rd semester lateral entry students (Diploma students). **Environmental studies**: The subject includes the environment awareness with respect to pollution and control; sources of energy,

awareness about the global warming, environmental education and legal aspects empowered buy the government. **Constitutions of India & Professional Ethics**: This subject gives the knowledge of constitution of India, fundamental rights, union, state executives, electoral, amendment procedure. The scope of engineering ethics, responsibilities, impediments to responsibility.

B. Basic Engineering

This category includes Elements of Mechanical Engineering, Elements of Civil Engineering & Engineering Mechanics, Basic Electronics, Computer Concepts & C Programming, Computer Aided Engineering Drawing, and Computer Programming Lab &Basic Electrical Engineering. It gives basic exposure of all engineering stream so that in future students can correlate mechanical engineering with other streams while working in multidisciplinary environment.

C. Fundamentals of Course Coverage are as follows

The core areas of mechanical engineering are Production, Design, and Thermal& CAD/CAM/CAE & Robotics.

Production Engineering

Production engineering is a combination of manufacturing technology with management science. The objective is to achieve the production process in the smoothly, most-sensible and cost-effective way. It encompasses the application of castings, machining processing, joining processes, metal cutting & tool design, metrology, machine tools, machining systems, automation, jigs and fixtures, and die and mould design and material science and design of automobile parts and machine designing and manufacturing.

These deal with integrated design and efficient planning of the entire manufacturing system. Subjects cover the following topics under this session are:

i. Manufacturing Process-I, II & III

ii. Foundry Technology

iii. Machine Drawing

iv. Non Traditional Machining

v. Non Destructive Testing

vi. Foundry & Forging Labs

vii. Machine shop

viii. Metrology & Measurement Lab

By studying these courses students will develop technical skills about the manufacturing processes such as casting, extrusion, rolling, welding, turning, milling, shaping, drilling concepts and also have hands on experience to carry out the practical work. Drawing also helps students to design and develop innovative ideas that can be incorporated for future technological development.

Design Engineering

The engineering design process is the set of steps that a designer takes to go from first, identifying a problem or need to, at the end, creating and developing a solution that solves the problem or meets the need. The steps of the engineering design process are define the problem, do background research, specify requirements, create alternative solutions, choose the best solution, do development work, build a prototype, test and redesign, etc. Subjects cover the following topics under this session are:

i. Mechanics of Materials

ii. Kinematics of Machines

iii. Design of Machine Elements – I, II

iv. Dynamics of Machines

v. Mechanical Vibrations

vi. Finite Element Methods

vii. Elemental Stress analysis

viii. Design Lab

ix. Material Testing Lab

The engineering design process is a multi-step process including the research, conceptualization, feasibility assessment, establishing design requirements, preliminary design, detailed design, production planning and tool design, and finally production.

Thermal Engineering

Thermal engineering deals with the conversion of heat energy between mediums and into other usable forms of energy. Most of the energy from thermal sources is converted into chemical, mechanical or electrical energy. In order to achieve this, thermal engineers are experts in heat transfer. Some areas a thermal engineer may specialize in include solar heating, boiler design or HVAC (heating, ventilation and air conditioning).Subjects cover the following topics under this session are:

i. Basic Thermodynamics
ii. Applied Thermodynamics
iii. Turbo Machines
iv. Heat & Mass Transfer
v. Biomass Engineering
vi. Non-Conventional Energy Sources
vii. Energy Engineering
viii. Fluid Machines Lab
ix. Energy Conversion Lab
x. Heat & Mass Transfer Lab

It provides a clear and detailed exposition of basic principles of thermodynamics. Concepts like enthalpy, entropy, reversibility, availability are presented in depth and in a simple manner. Important applications of thermodynamics like various engineering cycles and processes are explained in detail.

Introduction to latest topics are enclosed at the end. Each topic is further supplemented with solved problems including problems from gate, IES exams, objective questions along with answers, review questions and exercise problems along with answers for an in-depth understanding of the subject.

CAD/CAM/CAE & Robotics along with labs.

This subject is the state-of-the-practice of CAD/CAM/CAE systems which aims to provide a broad, solid understanding of each critical issue involved with the implementation and evaluation of systems; supplies step-by-step explanations of every aspect of implementation, from initial facility planning to long-term maintenance; a study of the proliferation of personal computers and their role in organizations; a discussion of the benefits and drawbacks of value added remarketers as an alternative to purchasing from conventional CAD/CAM companies; Subjects cover the following topics under this session are:

a) Computer Integrated Manufacturing

b) Mechatronics & Microprocessor

c) Computer Aided Engineering Drawing Lab

d) Computer Aided Machine Drawing Lab

e) Computer Aided Modelling & Analysis Lab

CAD/CAM/CAE Systems is intended as a guide for software, hardware, mechanical, manufacturing, industrial, and design engineers; draftspersons; managers; purchasing agents, acquisition personnel, and company officers responsible for deciding on CAD/CAM/CAE system implementation or augmentation; and graduate-level and continuing-education students in these disciplines.

2.2.2. Quality of internal semester Question papers, Assignments and Evaluation (20)

(Mention the initiatives, implementation details and analysis of learning levels related to quality of semester question papers, assignments and evaluation)

Initiatives for Evaluation

<table>
<tr><td colspan="2">Direct Assessment methods are formative as well as summative</td></tr>
<tr><td colspan="2">For some of the POs that are abstract, rubrics has been designed using performance indicators and shared with the students in advance. This helps students understand against which parameter their work will be judged with the “scoring rules”. These rubrics can be used by students in, revising, and judging their own work and progress.</td></tr>
<tr><td>Assignments</td><td rowspan="3">The assignment, Quiz and class test are a qualitative performance assessment tool designed to assess students' knowledge of engineering practices, framework, and problem solving. An analytic rubric was developed to assess students' knowledge with respect to the learning outcomes associated with the scenario tool.</td></tr>
<tr><td>Quiz</td></tr>
<tr><td>Class test</td></tr>
<tr><td>Group discussion/
Brainstorming</td><td>This is designed to assess students analytical along with the capability to communicate with others.</td></tr>
<tr><td>Midterm exams</td><td rowspan="2">Midterm and semester End examination are metric for assessing whether all the POs are attained or not. Examination is more focused on attainment of course outcomes and program outcomes using a descriptive exam.</td></tr>
<tr><td>End semester exam
(theory + practical)</td></tr>
<tr><td>Lab practical</td><td>This is mainly to assess student’s practical knowledge with their designing capabilities.</td></tr>
<tr><td>Course Evaluation</td><td>At the end of every semester, students give feedback for the course taught to them. In this feedback survey students tell how effective course was in order to achieve POs.</td></tr>
</table>

2.2.3. Quality of student projects (25)

(Quality of the project is measured in terms of consideration to factors including, but not limitedto, environment, safety, ethics, cost, type (application, product, research, review etc.) andstandards. Processes related to project identification, allotment, continuous monitoring,evaluation including demonstration of working prototypes and enhancing the relevance ofprojects. Mention Implementation details including details of POs and PSOs addressed throughthe projects with justification)

Initiatives

1. The student's projects are selected in line with department mission, vision and Program outcomes.
2. Students are provided with brief idea of various fields for selecting the project ideas.
3. The list of previous year projects is displayed at notice board which ensures no repetition of project work and also encourages students to enhance the previous works.
4. The faculties encourage the students to carry out in house projects and support will be provided with all necessary software and hardware.
5. The faculties encourage students to participate in project exhibitions. The project exhibition was aimed to provide common platform to exhibit their innovations and their work towards excellence in latest technology.
6. The faculties encourage students to publish their project work in reputed journals/conferences.
7. The faculties encourage students to avail the external funding schemes for their project work. (like KSCST, VTU project funding scheme)

Evaluation scheme for Final year Project

Phase-1

Sl. No.	Performance Indicator	Marks
(a)	Literature Survey / Phase 1 Report.	10
(b)	Presentation.	10
(d)	Questioner.	05

Phase-2

Sl. No.	Performance Indicator	Marks
(a)	Methodology Phase 2 Reports.	10
(b)	Presentation.	10
(d)	Questioner.	05

Phase-3

Sl. No.	Performance Indicator	Marks
(a)	Final Report	25
(b)	Demo with Presentation	15
(d)	Questioner	10

LIST OF SPONSORED PROJECTS-2013-14, 2014-15 and 2015-16

Sl. No.	Name of the Mentor	Title	Duration	Sponsoring agency
1.	Prof. H.S.Siddesha	Experimental and computational simulation of producing Ultra-fine grained Aluminum silicon carbide composites processed by constrained groove pressing	6 months **(2013-2014)**	KSCST, IISc, BANGALORE
2.	rof. H.S.Siddesha	Automatic Speed control and detection of gas leakage of vehicle using Eye Blink Sensor and Gas sensor	6 months (2013-2014)	KSCST, IISc, BANGALORE
3.	Prof. Girisha.C	Mechanical properties evaluation of Natural fibers reinforced Bio-Composites and fabrication of a Telephone stand.	6 months (2013-2014)	KSCST, IISc, BANGALORE
4.	Prof. Girisha.C	Mechanical and Thermal properties of Nano-Clay dispersed biodegradable polymer Nano-composites for the packaging applications.	6 months (2013-2014)	KSCST, IISc, BANGALORE
5.	Prof. H.S.Siddesha	Experimental and computational simulation of producing ultrafine grain Size in aluminum sheet by severe plastic deformation	6 months (2014-2015)	KSCST, IISc, BANGALORE
6.	Dr.Raju.B.R	Investigations on the influence of micro fillers on three-body abrasive wear behavior of glass fabire reinforced epoxy composites.	6 months (2014-2015)	KSCST, IISc, BANGALORE
7.	Prof.Sivasubramaniam	Biogas production from paper waste blend with cow Dung	6 months (2014-2015)	KSCST, IISc, BANGALORE
8.	Prof. Girisha.C	Bio-Composites Bumper for automobile	6 months (2014-2015)	KSCST, IISc, BANGALORE
9.	Dr.M.Eswaramoorthy	Design, development and experimental evaluation of V-Trough solar air heater with thermal energy storage for drying applications	6 months **(2014-2015)**	VGST-TRIP (INR: 30,000)
10.	Dr. M. Eswaramoorthy	Investigation on Biomass- Stove Thermoelectric Generator with Phase Change Materials		(R&D Grant in Aid) Institution of

				Engineers(India) Kolkatta
11.	Dr.M.Eswaramoorthy	Experimental Evaluation of Solar Photovoltaic-Thermoelectric with Latent Heat Effect	Two years **(2014-2016)**	VGST-SMYSR (INR: 400,000)
13.	Prof.Chandrakala	Design, Development and Experimental Evaluation of Hybrid Fresnel Using Lens Solar Stove	6 months **(2015-2016)**	KSCST, IISc, BANGALOR
14	Prof.Sivasubramaniam Prof. P.Shivashankar	Solar Powered Thermoelectric Refrigeration System	6 months (2015-2016)	KSCST, IISc, BANGALORE
15.	Prof.Sunilraj.B.A	Bio-Design And Fabrication Of Biocomposite Helmet	6 months (2015-2016)	KSCST, IISc, BANGALORE

List of seminars/Guest Lectures -2013-14, 2014-15 and 2015-16

Sl. No	Resources	Title	Date & Venue
1.	**Dr. M.C. Math,** Associate Professor, Department of Thermal Power Engineering, VTU, PG Center, Mysuru	"Biodiesel Development and Characterization – A Critical Assessment" Target: B.E. 3rd year Mechanical Engineering students and faculties	**01st October 2015** Seminar Hall, Department of Mechanical Engineering, ACSCE.
2.	**Dr.L.Boopathi,** Principal, Erode Sengunthar Engineering College, Erode.	"Environmental friendly composites and their applications" Target: B.E. 2nd year Mechanical Engineering students and faculties	**31st October 2015** Seminar Hall, Department of Mechanical Engineering, ACSCE.
3.	**Mr.Madeva Nagaral,** Design Engineer, HAL, Bangalore	" Design, Selection of Materials & Processing: In Aerospace" Target: B.E. 4th year Mechanical Engineering students and faculties	**2nd April 2016** Seminar Hall, Department of Mechanical Engineering, ACSCE.

4.	**Dr.C.B. VijayaVittala,** Professor and Head (R & D), HMSIT, Tumkur.	Imagine, Inspire and Innovate (innovations in engineering)	27/02/2015 Seminar Hall, Department of Mechanical Engineering, ACSCE.
5.	**Prof. GuntiRanga Srinivas,** Center for Product Design and Manufacturing (CPDM), Indian Institute of Science, Bangalore	Applied finite element analysis in Automotive, Aerospace, Biomedical Engineering	06/09/2014 Seminar Hall, Department of Mechanical Engineering, ACSCE.
6.	**Mr.GangaReddy** Senior Manager, HCL Technologies, Bangalore	Finite element methods and its applications	08/03/2014 Seminar Hall, Department of Mechanical Engineering, ACSCE.
7.	**Dr.D.K.Ramesh,** Professor, DepartmentMechanicalEngg., UVCE,Bangalore	Project Methodologies	27/09/2013 Seminar Hall, Department of Mechanical Engineering, ACSCE.

2.2.4. Initiatives related to industry interaction (15)

(Give details of the industry involvement in the program such as industry-attached laboratories,partial delivery of appropriate courses by industry experts etc. Mention the initiatives,implementation details and imDACt analysis)

We having frequent industrial interaction by our students and faculty members to know the state of techniques and exposed to industrial scenario.

Industrial Visits:

Sl. No	**Company visited**	**Date**	**No. of Students participated**	**Relevant Pos & PSOs**
1	TOYOTA KIRLOSKAR PRIVATE LIMITED	**11TH MAY 2016**	32 + 01 faculty	PO1,PO3,PO4,PO5,PO6, PO10,PO11,PO12 PSO1,PSO2
2	ACE DESIGNERS SOLUTION PRIVATE LIMITED	**20TH FEBRUARY 2016**	32 + 02 faculty	PO1,PO3,PO4,PO5,PO6, PO10,PO11,PO12 PSO1,PSO2
3.	MAHATMA GANDHI INSTITUTE OF RURAL ENERGY DEVELOPMENT	**6TH OCTOBER 2015**	52 + 02 faculty	PO1,PO3,PO4,PO5,PO6, PO10,PO11,PO12 PSO1,PSO2

2.2.5. Initiatives related to industry internship/summer training (15)

List of Industrial Internships/ training

Student Name	Industry Name	Title of the Training & Duration	Implementation Details
KARTHIK ATHREYA (1AH14ME021) ARCHITHA N (1AH14ME055) AJAY VERMA MC (1AH12ME053)	**VOLVO CONSTRUCTION EQUIPMENT INDIA PEENYA, BANGALORE**	Volvo Construction Equipment's follows **Six Sigma** Internship Period **4TH January, 2016 to 6th February, 2016**	Exposure to the manufacturing industry (from the scratch to the completion of the product). Importance of quality, safety, maintenance of the product being manufactured or the components being used to manufacture. Poke – Yoke (mistake proofing) is a technique followed by VCE to manufacture good quality products.
PRANAV M.K 1AH12ME032 ANANDU K SOMAN 1AH12ME004 RANJIT.J 1AH12ME414 JOBIN JOHNSON 1AH12ME015	**HMT MACHINE TOOLS LTD. BANGALORE COMPLEX JALAHALLI,HMT(PO) BANGALORE-560 013**	Internship training on HMT Machine tools Internship Period **3rd January, 2016 to 2nd February, 2016**	Importance of quality, safety, maintenance of the product being manufactured or the components being used to manufacture. Exposure to the manufacturing industry (from the scratch to the completion of the product).
DEEPAK NAYAK 1AH12ME009 H HARSHA 1AH12ME014	**Bharath Electrical Limited BSTC Department Bangalore**	Internship project training on BEL Internship Period **11th January, 2016 to 29th January, 2016**	Electrical components Exposure to the manufacturing industry (from the scratch to the completion of the product).
NAGARAJU K N 1AH12ME028	**HMT MACHINE TOOLS LTD.,**	Internship training on	Importance of quality, safety, maintenance of the product being

MANOJ KUMAR A K 1AH12ME020	**BANGALORE COMPLEX JAJAHALLI BANGALORE-560013**	HMT Machine tools Internship period **3rd January, 2015 to 2nd February, 2015**	manufactured or the components being used to manufacture. Exposure to the manufacturing industry (from the scratch to the completion of the product).
DILIP KUMAR N 1AH12ME010			
BHAVAN KUMAR 1AH12ME007			

CRITERIA 3	Course Outcomes (COs) and Program Outcomes (POs)

3.COURSE OUTCOMES AND PROGRAM OUTCOMES (120)

Program Outcomes:

1. Demonstrate knowledge of mathematics such as multi-variable calculus, Differential equations, science and engineering.
2. Demonstrate an ability to identify, formulate and solve mechanical engineering problems.
3. Model, analyze, design and realize physical systems, components or processes.
4. Plan and conduct an experimental program and evaluate the results.
5. Use modern engineering tools, software and equipment to analyze problems.
6. Understand the global, societal context of engineering.
7. Provide mechanical engineering solutions to green and sustainable development.
8. Demonstrate knowledge of professional and ethical responsibilities.
9. Work with others to accomplish common goals.
10. Communicate effectively in both verbal and written form.
11. Develop confidence for self-education and ability for life-long learning.
12. Complete a project with financial management skill.

PSO-Program Specific Objectives

1. Graduates will demonstrate the knowledge of applied mathematics and advanced software tools for design specification, development such as fabrication, analysis like testing and operation of the physical systems, components and processes involved in mechanical engineering.

2. Graduates will demonstrate the knowledge, skill and attitude to analyze the cause and effects on machine elements, processes and systems.

3.1.Establish the correlation between the courses and the Program Outcomes (PO's) and Program Specific Outcomes (PSO's) (20)

Subjective to criteria 3.1.1, number of outcomes desired has to be around 6 - ACS college of engineering developed the Course Outcomes before the revised SAR was disseminated/ published in the NBA website.
Number of Course Outcomes of mechanical engineering is defined according to faculty and peers knowledge and experience in teaching field.

8th Semester Subjects

Subject: Operation Management **Subject Code: 10ME81**

CO-1	Identify the Properties of forecasting productivity characteristics of operation decisions
CO-2	Knowledge of obtaining techniques of aggregate planning mathematical techniques of scheduling process determining capacity requirement concept of tenders
CO-3	To acquire skills to charting techniques and Determine the stability of production effective capacity material requirement planning procurement process
C04	To acquire knowledge about the supply chain management, and importance of purchasing in the organization. To take the decision by the Break Even analysis.

Subject: Control Engineering **Subject Code : 10ME82**

CO-1	Identify the type of control system, their applications, limitations, Concepts of feedback, Types of controllers and also arrive at the transfer functions of the given physical system (i.e. Mechanical , Electrical , Thermal, Hydraulic) models by writing Differential Equations using Laplace Transformation
CO-2	Produce the Transfer Function by Block Reduction Technique and also using Mason's Formula for Signal Flow Graph and also Interpret the S-plane with the terms like settling-time, rise-time and overshoot to step-response. Apply Routh-Hurwitz criterion to determine the stability of time- invariant systems.
CO-3	Apply frequency domain analysis techniques, and design control systems to achieve specific dynamic characteristics, Possess knowledge of stability and controls, Determine the stability of control systems using Nyquist methods and also by using Bode Attenuation diagrams
CO-4	Determine the stability of control systems using Root-Locus Technique and feedback control systems using frequency domain and state-variable methods. Possess knowledge of stability and controls

Subject: Power Plant Engineering **Subject Code: 10ME833**

CO-1	Understand types of fuels, types of stokers, types of circulation, Advantages and disadvantages of pulverised coal, Equipment for preparation and burning of pulverised coal ,working of unit system and bin system, Construction and working of LaMount, Benson, Velox, Schmidt, Loeffer and Ramson steam generators. Natural and forced circulation in power plants.
CO-2	Understand different draught systems, different cooling towers, boiler mountings and accessories, height of chimney, different cooling towers, methods of starting diesel engine, methods of cooling diesel power plants, hydrographs, flow duration curve , mass curve, Penstock, water hammer, surge tanks, gates and valves, power house and knowledge of the important Hydel Installations in India
CO-3	Understand the components and working of nuclear power plant, nuclear fission and fusion reactions, disposal of nuclear waste and have the knowledge about the reactors of the following types - Pressurized water reactor, Boiling water reactor, Sodium graphite reactor(liquid metal reactor), and Nuclear fuels. Define connected load, maximum demand, demand factor, investigations to be done during site selection for power plants. Have the knowledge about selection of plant and generating equipments, performance and operating characteristics of power plants, tariffs for electrical energy.

Subject: Automotive Engineering **Subject Code: 10ME844**

CO-1	Students are able to understand an automobile engine components and fuel supply system of construction, operation, application.
CO-2	Students are able to understand improving of performance of IC engine by supercharger, turbocharger & ignition system.
CO-3	Students are able understand different gear system and power transmission system to rear wheel and of the I C engine..
CO-4	Students are able to understand and suspension system of the I C engine & automotive emission control system and standard of the emission controlled

Subject: Foundry Technology **Subject Code: 10ME838**

CO-1	Students can able to demonstrate the Oxidation of liquid metals, gas dissolution in liquid metals, methods of degassing, fluidity, factors affecting fluidity, fluidity tests, hot tearing, shrinkage of liquid metals. Introduction to casting design, redesign considerations, design for minimum casting stresses, design for directional solidification for different condition.
CO-2	Students can able to understand the concept of Crystallization and development of cast structure and concept of progressive and directional solidification, need of gating system and rise ring system in casting methods.
CO-3	Students can able to demonstrate the Special Molding Techniques for manufacturing different components by using different pattern, Developments in cupola melting – hot blast cupola, water cooled cupola, balanced blast cupola, coke less cupola, cupola charge calculations, Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some ferrous metals
CO-4	Students can able to demonstrate the Non-Ferrous Foundry: Melting procedures, casting characteristics, production, specification, and properties of some typical aluminum, copper and magnesium based alloy castings. Modernization And Mechanization in foundry techniques in molding, core, material handling equipment's etc.

Subject: Engineering Economics **Subject Code: 10ME71**

CO-1	Identify the type of interest simple compound preset worth comparison equivalent annual worth comparison shrinking fund application concepts using formulas compound interest tables
CO-2	Knowledge of obtaining annual payment monthly payment cash flow diagram depreciation.
CO-3	To acquire skills regarding direct costs components of costs financial statement profit and loss account, Determine the stability of profit planning balance sheet scope of finance finance functions

Subject: Mechanical Vibrations **Subject Code: 10ME72**

CO-1	Decompose any periodic function into a series of simple harmonic motions using Fourier series analysis, Solve for resultant motion by analytically and graphically. Choose Newton's Laws of motion and energy principles in deriving governing equations and to find frequency in un damped free vibrations.
CO-2	Identify different types of damping, Solve over damped critically damped and under damped system problems to find equation of motion. And Describe, Solve magnification factor, transmissibility ratio, rotating and reciprocating unbalance, vibration isolation in forced SDOF.

CO-3	Describe vibrometer, accelerometer and frequency measuring instruments Fullerton tachometer, Frahm tachometer and whirling speed of shafts. And solve for mode shapes and natural frequency in 2 DOF systems.
CO-4	Explain signal analysis, dynamic testing of machines, experimental modal analysis, machine condition monitoring techniques and Solve vibration problems that contain multiple degrees of freedom using Stodola method, Holzers method, matrix iteration method and dunker leys method.

Subject: Hydraulics & Pneumatics **Subject Code: 10ME73**

CO-1	Describe the construction, structure & working Principle of various Hydraulic pumps, motors and Actuators and their Performance Characteristics
CO-2	Comprehend &Analyze Single& Double Acting Hydraulic Cylinder circuits and their Control Components and Maintenance of Hydraulic Systems.
CO-3	Describe the construction, structure & working Principle of various Pneumatic Actuators, Pneumatic Control Valves Applications
CO-4	Recall the Signal Processing Elements such as OR & AND gates in pneumatic applications and Multi cylinder applications and Electro-Pneumatic Control

Subject: Operation Research **Subject Code: 10ME74**

CO-1	Ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively. Will have the knowledge of formulating mathematical models for quantitative analysis
CO-2	Students will have the knowledge of optimizing the transportation models and Integer Programming models.
CO-3	Students will have the knowledge of Project management techniques: PERT-CPM and Queuing Theory.
CO-4	Students will have the knowledge of Game Theory problems and Sequencing of Job's.

Subject: Non-Conventional Energy Sources **Subject Code: 10ME754**

CO-1	Ability to understand the availability of energy, consumption and conservations and alternative energy sources.
CO-2	Ability to understand the alternate sources of energy like solar, wind, geothermal, tidal, OTEC, etc
CO-3	Ability to understand global warming by adopting green and clean technologies like solar collectors, solar pond, wind generators, wind machines, solar water still etc.
CO-4	Ability to understand the alternate sources of energy like Energy from tidal system, geothermal, Biomass, bio digestion and Hydrogen energy.

Subject: Experimental Stress Analysis **Subject Code: 10ME761**

CO-1	Ability to understand fundamentals of strain gauges and types, potentiometer circuits, Wheatstone bridge with constant voltage, different types of strain rosettes.
CO-2	The student is aware of the overall concepts of stress/strain analysis by experimental means, photo elasticity for two dimensional and three dimensional, scattered light polar scopes, brittle coating, birefringence coating.
CO-3	The student is familiar with the theory and practice of common experimental stress analysis methods including grid methods, photo elasticity, moiré analysis, interferometer and strain gauges.
CO-4	Ability to understand the problems on strain analysis, two element rosette, three element rosette, delta rosette, crack patterns in brittle coating techniques, holography.

Subject: Design Laboratory **Subject Code: 10ME77**

CO-1	Understand the concept of natural frequency and damping coefficient in a single DOF vibrating system.
CO-2	Students are able analyze the balancing of rotating and reciprocating masses by using static and dynamic balance.
CO-3	Ability to demonstrate the concept of stress concentration for different photo- elastic materials.
CO-4	Students are able to determine pressure distribution in journal bearings.

Subject: CIM & Automation Lab **Subject Code: 10ME78**

CO-1	Ability to identify the type of machining centre for the geometry given (cylindrical or prismatic), write the part program, explain the instructions, examine for the error in the program and choose right G and M codes to optimize the program and construct the final geometry by running the simulation using the software.
CO-2	To practically relate to concepts discussed in Computer Integrated Manufacturing course to write CNC part programs using SWAN SOFT CNC simulation package for simulation of machining operations such as Turning, Drilling & Milling. To understand & write programs for Flexible Manufacturing Systems &Robotics.

6th Semester Subjects

Subject: Computer Integrated Manufacturing **Subject Code: 10ME61**

CO-1	Demonstrate the knowledge by Defining and classifying automation and its types, differentiate CIM from automation, to describe various manufacturing terms, memorize the models and solve problems using engineering fundamentals. Identify and distinguish different mechanisms used in linear or rotary work part transfer system for an automated manufacturing firm.
CO-2	Demonstrate the knowledge by describing assembly line, storage buffer line; differentiate upper bound approach with lower bound approach in an automated system. Identify the steps in sequence to solve line balancing problems using balance delay methods such as largest Candidate rule, Kilbridge and Westers method or Ranked positional weight method.
CO-3	Demonstrate the knowledge to describe different types of automated assembly system, Parts feeding devices, automated guided vehicles, Vehicle guidance and routing, System management, CAPP systems such as retrieval type or generative type, short term or long term capacity planning. Memorize the models and solve numerical problems using engineering fundamentals.
CO-4	Demonstrate the knowledge of classifying elements of NC/CNC, differentiate types of Machining centres, Robot configurations, sensors, to identify and formulate NC codes to develop part program for milling and turning, robot programming for pick & place and palletizing.

Subject: Design of Machine Elements - II **Subject Code: 10ME62**

CO-1	The students will be familiar to analyze & design curved beams, compound cylinders and behaviour of stresses. And also student will be able to design and select power transmission elements

CO-2	The students will be familiar to analyze & design helical compression & tension springs with respect to static & dynamic axial loads
CO-3	The students will be familiar to analyze & design spur, helical, bevel, & worm gears with respect to tooth bending strength. Analyze and design various types of brakes and clutches and check for heat generation and dissipation
CO-4	The Students will understand the principle operation of bearings, and the properties of lubricants. Also analyze and design the different parts of IC Engine.

Subject: Heat and Mass Transfer **Subject Code: 10ME63**

CO-1	Understand basic modes of heat transfer, conduction with and without internal heat generation, critical thickness of insulation and extended surfaces with the practical utilities.
CO-2	Predict the thermal response of engineering systems to energy transfer mechanisms for transient and steady state situations.
CO-3	Understand concept and mechanism of natural, forced convection, radiation and also the various empirical correlations used in different fluid flow situations.
CO-4	Understand the design and performance analysis of heat exchangers and their practical applications, mass transfer theories, Condensation and Boiling phenomena.

Subject: Finite Element Methods **Subject Code: 10ME64**

CO-1	Student will have the knowledge , understanding of equilibrium equations, stress-train relations, general steps in FEM ,Applications, limitations and skill to solve for stiffness matrix for bar element using principle of minimum potential energy, , Raleigh's Ritz method and Gale kin's method
CO-2	Students will have the knowledge of Interpolation polynomials- Linear, quadratic and cubic. Simplex complex and multiplex elements. 2D PASCAL's triangle. MET elements-Shape functions and Nodal load vector, Strain displacement matrix and Jacobean for triangular and rectangular element and skill to solve displacements, reactions and stresses by using penalty approach and elimination approach. Gauss-elimination technique for bars and stepped bar elements

CO-3	Student will have the knowledge of Lagrange's interpolation, Higher order one dimensional elements-Quadratic and cubic element and their shape functions. Shape function of 2-D quadrilateral element-linear, quadric element Isoperimetric, Sub parametric and Super parametric elements. Numerical integration and skill to solve for displacement, strain and stresses for truss element using stiffness matrix.
CO-4	Student will have the knowledge of Hermit shape functions for beam element, Steady state heat transfer, 1D heat conduction governing and skill to solve for Derivation of stiffness matrix for beam element using beams carrying concentrated, UDL , linearly varying loads and solve for heat conduction using Gale kin's approach for heat conduction and 1D heat transfer in thin fins

Subject: Mechatronics & Microprocessor **Subject Code: 10ME65**

CO-1	Define and Choose measuring & control systems on microprocessor based controllers, understand working principals of various sensors, transducers. Use the knowledge of various sensors, transducers, their principles and applications.
CO-2	Summarize the evolution of microprocessor and its concepts. Review the basics of Boolean algebra, logical gates, binary, hexadecimal, decimal number systems, conversions of real, floating point notations. Explain the architecture of 8085A processor & its terminologies like CPU, ALU, registers, fetch cycles, Intel 8085, programming languages. Compare microprocessor and microcontrollers.
CO-3	Describe and Discuss various data, address and control buses, instruction sets, assembly level language and other languages. Explain timing and control unit basic concepts, data flow, register organization.
CO-4	Distinguish between electrical and mechanical systems, switches. Electrical actuators, DC, AC, stepper motors. Explain and discuss signal conditioning principles of various amplifiers, ADC, DAC, multiplexers, etc. to solve modern engineering problems.

Subject: Heat & Mass Transfer Laboratory **Subject Code: 10ME67**

CO-1	At the end of the course, students will be able to Understand conduction phenomenon thoroughly in objects of different geometries they can determine the thermal conductivity of composite wall, lagging material and critical heat flux.
CO-2	Learn the thermal performance analysis of heat exchangers, their practical applications, and design.
CO-3	Understand the concept and mechanism of forced, natural convection taking place in objects different geometries, the various empirical correlations used in different fluid flow situations.
CO-4	Understand the performance analysis of Vapour compression refrigeration cycle and Air conditioning system.

Subject: Computer Aided Modelling and Analysis Laboratory **Subject Code: 10ME68**

CO-1	Students will be able to understand and analyze the concept of FEA to the bar elements, beam elements and truss elements.
CO-2	Students will be able to understand and analyze structural and thermal problems. Also students will analyze the dynamic problems.

5th Semester Subjects

Subject: Management and Entrepreneurship **Subject Code: 10ME51**

CO-1	Students shall demonstrate the Knowledge associated with Scope and functional areas, roles and levels, approaches of management& administration, purpose and steps of planning and Decision process.
CO-2	Students shall demonstrate the Knowledge associated with Organizing, staffing, process of selection and recruitment, span of control, MBO& MBE Directing, steps in Coordination and Controlling.
CO-3	Students shall demonstrate the Knowledge associated with Entrepreneur, Types of Entrepreneur, Stages in entrepreneurial process, barriers and quality of entrepreneurship, role of SSI, steps to start SSI, Government policies and support & role of SSIs in economic development.
CO-4	Students shall demonstrate the Knowledge associated with different functions of institutional support and Students can also demonstrate the Project Report, Appraisal and feasibility studies.

Subject: Design of Machine Elements - 1 **Subject Code: 10ME52**

CO-1	Students will have the knowledge of normal, shear, biaxial and tri axial stresses, Stress tensor, Principal Stresses, Stress-Strain diagrams, codes & Standards, design considerations and Stress Analysis, static loads, theories of failures.
CO-2	Students will be able to analyze different loading conditions such as static, fatigue and impact load using theories of failure. Design threaded fasteners under static, dynamic and impact loads.
CO-3	Students will be able to design shafts under fluctuating and combined loads, cotter & knuckle joint, keys and couplings
CO-4	Students will be able to design different machine components such as Riveted and Welded joints, power screws such as screw jack

Subject: Energy Engineering **Subject Code: 10ME53**

CO-1	Students will be able to understand the working mechanism, equipment used, advantages and disadvantages of steam power plant, and will know the mechanisms of generators used in Steam power plants and ability to solve problems involving height of chimney to produce a given draft.
CO-2	Students will be able to understand the working mechanism, equipment used, advantages and disadvantages of diesel engine power plant, hydroelectric power plant and ability to solve problems related to hydrographs, flow duration and mass curves.
CO-3	Students will be able to understand the working mechanism, advantages and disadvantages of nuclear power plant and the knowledge to harness energy sources from solar energy, wind energy, and ability to solve problems related to radiation and wind energy
CO-4	Students will be able will understand the knowledge to harness energy from Tidal power, Ocean Thermal Energy, Geothermal Energy, Biomass energy and methods.

Subject: Dynamics of Machines **Subject Code: 10ME54**

CO-1	To Analysis and balance the static and dynamic equilibrium of single slider crank mechanism and four bar mechanism by the understanding principle of equilibrium of two body ,three body , two body with torque, four body condition and principle of virtual work.
CO-2	Define and derive the types of friction and governor. To understand the ratio of belt tension and friction effect on belt drive. To Analysis the controlling force, stability , sensitiveness, Isochronisms and effect of power of porter and Hartnell governors
CO-3	To analysis static and dynamic Balancing of rotating and reciprocating masses in same plane and different plane
CO-4	Analysis on gyroscopic effect on aeroplane, ship and auto motive vehicle. And analysis of different follower on tangent, circular arc and undercutting cams.

Subject: Manufacturing Process - III **Subject Code: 10ME55**

CO-1	At the end of the course, students will be able to Understand metal working processes, effects of parameters, types of stresses and mechanics of metal working.
CO-2	Understand, classify the primary forming processes like forging , rolling, drawing, extrusion and sheet metal forming processes , equipment used, calculation of load, process variables, defect encountered and numerical problems
CO-3	Understand the principles and applications and limitations of different types of high energy rate forming processes.

CO-4	Understand the principle and production methods of metal powders and their advantages applications and limitations.

Subject: Turbo machines **Subject Code: 10ME56**

CO-1	Define of a Turbo machine; parts of a Turbo machine; Comparison with positive displacement machine; Classification: Application of First and Second Laws to Turbo machines, Efficiencies. Dimensionless parameters and their physical significance; Effect of Reynolds number; Specific speed; Illustrative examples on dimensional analysis and model studies, Classification; Pelton Turbine-velocity triangles, Design parameters, turbine efficiency, volumetric efficiency; Francis turbine – velocity triangles, runner shapes for different blade speeds for centrifugal pump and steam turbine
CO-2	Euler Turbine equation; Alternate form of Euler turbine equation – components of energy transfer; Degree of reaction; General analysis of a Turbo machine – effect of blade discharge angle on energy transfer and degree of reaction; General analysis of centrifugal pumps and compressors – Effect of blade discharge angle on performance; Theoretical head – capacity relationship
CO-3	Axial flow compressors and pumps – general expression for degree of reaction; velocity triangles for different values of degree of reaction; General analysis of axial and radial flow turbines – Utilization factor; Vane efficiency; Relation between utilization factor and degree of reaction; condition for maximum utilization factor – optimum blade speed ratio for different types of turbines

Subject: Fluid Mechanics and Machines Laboratory **Subject Code: 10ME57**

CO-1	At the end of the course, students will be able to determine coefficient of friction, minor losses in flow through the pipes.
CO-2	Students will be able to calibrate flow measuring devices such as orifice, plate meter, nozzle, venturimeter and V- Notch and performance of centrifugal pumps.
CO-3	Students will have the ability to test the performance of turbines like pelton wheel, Francis turbine and Kaplan turbine.
CO-4	Students will have the ability to test the performance of two stages reciprocating air compressor and air blower

Subject: Energy Conversion Engineering Laboratory **Subject Code: 10ME58**

CO-1	At the end of the course, students will be able to to determine the Flash point, Fire point, calorific value and viscosity of various lubrication oils.
CO-2	Students will have the knowledge of engine operation through valve timing diagram.

CO-3	To conduct performance test on Two stroke Petrol Engine
CO-4	To conduct performance test on 4 stroke Diesel Engine, Four Stroke Petrol Engines

4th Semester

Subject: Mechanical Measurements and Metrology **Subject Code: 10ME42B**

CO-1	Students shall demonstrate the knowledge associated with various Standards of length, Use of slip gauges, and System of limits, fits and tolerance and Design of Gauges.
CO-2	Students shall demonstrate the knowledge associated with Comparators (Mech, Optical, and Electrical& Pneumatic), Use of Sine bar, Interferometer, and measurement of Screw threads & Gear tooth parameters.
CO-3	Students shall demonstrate the knowledge associated with Generalized Measurement system, Transducers, CRO, Oscillographs, and XY Plotters.
CO-4	Students shall demonstrate the knowledge associated with Measurement of Force, Torque, and Temperature& Strain measurement.

Subject: Applied thermodynamics **Subject Code: 10ME43**

CO-1	Student will be able to Define various concepts of thermodynamics combustion.
CO-2	Student will be able to apply concepts of thermodynamics for evaluating the properties of fluids and analysis cycles used in various industrial systems such as mechanical Power Production by using engines, steam power plant, gas turbine, air compressor, refrigeration and air conditioning.
CO-3	Student will be able to demonstrate working procedure of Jet and Rocket Propulsion system.
CO-4	Students will be able to Identify, formulate and solve thermal engineering problems.

Subject: Kinematics of Machines **Subject Code: 10ME44**

CO-1	Define, link, kinematic pair, DOF, Chain, Mechanism, machine, structure. Describe, choose and differentiate mechanisms such as four bar mechanism and its inversions, Quick return motion mechanisms-Drag link mechanism, Whitworth mechanism and Crank and slotted lever Mechanism etc. and solve for mobility.

CO-2	Identify interpreted and examine for velocity & acceleration for different mechanisms by graphical, analytical and instantaneous center methods.
CO-3	Define gear terminology ,describe Path of contact, Arc of contact, Contact ratio of spur, helical, bevel and worm gears .and Comparison of involutes and cycloid teeth. Identify, sketch and examine velocity ratio for different gear trains using Algebraic and tabular methods.
CO-4	Classify types of cams and followers, sketch displacement diagram and cam profiles for SHM, Uniform velocity, uniform acceleration and retardation and Cycloidal motions.

Subject: Manufacturing Process – II **Subject Code: 10ME45**

CO-1	At the end of the course, students will be able to understand metal cutting principles, single point cutting tool, mechanics of chip formation cutting parameters, relationship among cutting forces, tool life and numerical problems. Cutting tool materials, properties and their selection.
CO-2	Classify and understand the principle and constructional features, operations performed on -lathe, drilling machine, milling machine, indexing mechanism, grinding machine, broaching machine etc.
CO-3	Understand the principles, applications and features of super finishing, polishing and buffing operations, honing etc.
CO-4	Understand the principle and operations and types of non-traditional machines and methods of operations along with applications.

Subject: Fluid Mechanics **Subject Code: 10ME46B**

CO-1	Understand of the basic principles of and applications of fluid mechanics and knowledge of the different properties of the fluids and ability to solve problems related to manometers & on submerged plane surfaces.
CO-2	Understand of the basic concepts of buoyancy, kinematics and fluid dynamics, and ability to solve problems related to buoyancy, fluid kinematics and fluid dynamics.
CO-3	Understand of the basic concepts involving fluid flow measuring equipments, friction in pipe flow and an ability to apply dimensional analysis.
CO-4	Understand of the basic concepts of fluid statics and fluid dynamics, laminar and turbulent flows, compressible flow, lift and drag and ability to solve problems related to laminar and turbulent flows.

3rd Semester Subjects

Subject: Material Science and Metallurgy **Subject Code: 10ME32A**

CO-1	An understanding of types of structures, imperfections in metals, diffusion mechanism, evaluation of mechanical properties by subjecting to various stresses and failure mechanism.
CO-2	An understanding of the basic concepts of phase transformation during solidification, phase diagrams, iron carbon equilibrium diagram, classifications of steel, iron, AL, CU and it's alloys .
CO-3	An understanding of the basic concepts of heat treatment process and it's influences on properties of metal.
CO-4	An understanding of the basic concepts of classification, fabrication and applications of composite materials.

Subject: Basic Thermodynamics **Subject Code: 10ME33**

CO-1	Students are able to understand the basic concepts like property, system, equilibrium, temperature, different forms of work and heat.
CO-2	Student will be able to analyze the first law of thermodynamics and second law of thermodynamics applicable to closed system and open system.
CO-3	Student will be able to apply first law apply first law of thermodynamics and second law of thermodynamics to pure substance, real and ideal gases.

Subject: Mechanics of Materials **Subject Code: 10ME34**

CO-1	Students will have the knowledge of engineering properties of materials; fundamental concepts of stress and strain, Volumetric strain, Principle of superposition, elastic constants, Stresses in Composite Section.
CO-2	Students will be able to understand and analyze the Compound Stresses, Mohr's circle, strain energy, Stresses in thin and thick cylinders

CO-3	Students will be able to understand and analyze the Bending Moments and Shear Force diagrams and bending stresses involved in Beams.
CO-4	Students will be able to understand and analyze the Deflection of Beams, Torsion of Circular Shafts and Elastic Stability of Columns.

Subject: Manufacturing Process - I **Subject Code: 10ME35**

CO-1	Ability to describe and discuss appropriate manufacturing processes, pattern selection, casting methods, identify appropriate sand molds, binders, additives. Choose and classify core types, gating, riser system, jolt type, squeeze type, jolt & squeeze type and sand slinger for solving engineering problems.
CO-2	Ability to select special molding process green sand, core sand, dry sand, Sweep mould, CO2 mould, Shell mould, Investment mold. Metal molds: Gravity die-casting, Pressure die casting, centrifugal casting, Squeeze Casting, Slush casting, Thixocasting and continuous casting processes. Classify furnaces on constructional features & working principle of Gas fired pit furnace, resistance furnace, coreless induction furnace, electric arc furnace, cupola furnace.
CO-3	Define and classify Principles & application, advantages & limitations of welding processes like arc welding, MAW, FSMAW, TIG & MIG, SAW and AHW. Oxy-Acetylene welding, Flame characteristics, Gas torch construction & working. Forward and backward welding. Discuss special type of welding such as resistance welding, Seam welding, butt welding, spot welding, projection welding, friction welding, explosive welding, and many other welding processes.
CO-4	Ability to analyze structure of welds, formation of different zones during welding. Heat affected zone (HAZ). Parameters affecting HAZ. Effect of carbon content on structure and properties of steel. Shrinkage in welds & Residual stresses. Concept of electrodes, Filler rod and fluxes. Welding defects – Detection causes & remedy. Discuss and compare principles of soldering & brazing. Classify types of soldering & brazing methods. Inspection Methods used for inspection of casting and welding. And NDT tests like visual, magnetic particle, fluorescent particle, ultrasonic, radiography, eddy current, holography methods of Inspection.

Subject: Computer Aided Machine Drawing **Subject Code: 10ME36A/10ME46A**

CO-1	Student will be able to sketch sections of solids of various polyhedrons, and also visualize and draw orthographic views of simple machine parts.
CO-2	Student is able to understand and draw various thread forms, standard keys, joints, couplings using memorable drawing.
CO-3	The students are able to visualize and prepare detailed drawing of a given part and draw assembly of machine parts.

CO-4	Read and interpret a given drawing and Create 2-D and 3-D models using solid edge software with manufacturing purposes.

Subject: Metallography and Material Testing Laboratory Subject Code: 10MEL37A / 47A

CO-1	Ability to prepare standard metallographic samples for engineering materials to examine microstructure.
CO-2	Identify right non destructive test to examine the defects for the samples given.
CO-3	Ability to conduct destructive testing experiments on Tensile, compression, Hardness, Bending, Torsion, Impact tests to analyze and interpret mechanical properties of the samples.

Subject: Foundry and Forging Laboratory Subject Code: 10MEL38A/48A

CO-1	Prepare sand specimens and to conduct experiments like Permeability test, Core hardness & Mould hardness, Sieve Analysis, Clay content, etc and determine the properties of mold sand.
CO-2	Name, list and use the foundry tools, prepare molds with and without patterns.
CO-3	Name, list and use the forging tools, calculate of length of the raw material and to prepare the model.

3.1.2. **CO-PO matrices of courses selected in 3.1.1 (six matrices to be mentioned; one per semester from 3rd to 8th semester) (05)**

Subject Code	COs	Program Outcomes (POs)											
		PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12
10ME32A	CO1	3			3	1			2	2		2	
	CO2	2	3			1			1	1		1	
	CO3	2	2	2	1			1	1			1	
	CO4	3	1	1	3	2	2	2	1			1	
10ME33	CO1	3	3	3			1			1	1	1	
	CO2	3	3	3			1			1	1	1	
	CO3	3	3	3			1			1	1	1	
10ME34	CO1	3	3	2			1		1		1	1	
	CO2	3	3	2			1		1		1	1	
	CO3	3	3	2			1		1		1	1	
	CO4	3	3	2			1		1		1	1	
10ME35	CO1	2	1				1		1		2	1	
	CO2	2	1				1		1		2	1	
	CO3	2	1				1		1		2	1	
	CO4	2	1				1		1		2	1	
10ME36A	CO1		3	2		3			1		2		
	CO2	2	3	2		3			1		2		
	CO3		2	3		3			1		2		
	CO4		2	3		3			1		2		
10MEL37A	CO1	2	3	2	1	1			2	2	1	1	
	CO2	2	3	2	1	1			2	2	1	1	
	CO3	2	3	2	1	1			2	2	1	1	
10MEL38A	CO1	2	2	2	2	1			1	2	1	1	
	CO2	2	2	2	2	1			1	2	1	1	
	CO3	2	2	2	2	1			1	2	1	1	
10ME42B	CO1	3	2			2					1	1	
	CO2	2	2			2					1	1	
	CO3	2	2			2					1	1	
	CO4	2	2			2					1	1	
10ME43	CO1	2	2	1			1		1		1	1	
	CO2	3	3	1			1		1		1	1	
	CO3	3	3	1			1		1		1	1	
10ME44	CO1	1		3			1		1		2	1	

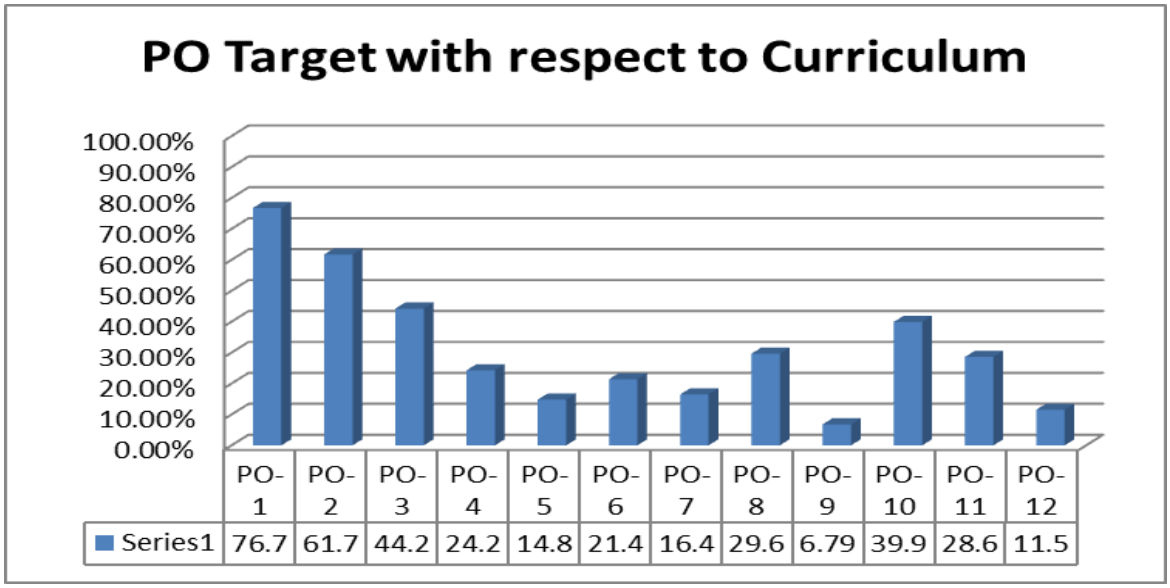
	CO2	3	3	2			1		1		1	1	
	CO3	3	3	2			1		1		1	1	
	CO4	2	3	3			1		1		1	1	
10ME45	CO1	3	3			2					1		
	CO2	3	3			2					1		
	CO3	3									1		
	CO4	3									1		
10ME46B	CO1	3	3								1		
	CO2	3	3								1		
	CO3	3	3	1							1		
	CO4	3	3								1		
10MEL47B	CO1	2	3	2	1	1			2	2	1	1	
	CO2	2	3	2	1	1			2	2	1	1	
	CO3	2	3	2	1	1			2	2	1	1	
10MEL48B	CO1	2	2	2	2	1			1	2	1	1	
	CO2	2	2	2	2	1			1	2	1	1	
10AL51	CO1	1					3	2	1	1	3	1	1
	CO2	1					3	2	1	1	3	1	1
	CO3	1					3	2	1	1	3	1	3
	CO4	1					3	2	1	1	3	1	3
10ME52	CO1	3	3	2			1		1		1	1	
	CO2	3	3	2			1		1		1	1	
	CO3	3	3	2			1		1		1	1	
	CO4	3	3	2			1		1		1	1	
10ME53	CO1	1	1				3	2			2		
	CO2	1	1				3	2			2		
	CO3	1	1				3	2			2		
	CO4						3	2			2		
10ME54	CO1	2	2	3	2		2	2	2			1	
	CO2	2	2	3	2		2	2	2			1	
	CO3	3	3	3	2		2	1	2			1	
	CO4	3	3	3	1		2	2	1			2	
10ME55	CO1	2				2					1		
	CO2	2	3			2					1		
	CO3	2		2							1		
	CO4			2							1		
10ME56	CO1	3	3	1			1		1		1	1	
	CO2	3	3	1			1		1		1	1	

	CO3	3	3	1			1		1		1	1	
10MEL57	CO1	3	2		3						1		
	CO2	3	2		3						1		
	CO3	3	2		3						1		
	CO4	3	2		3						1		
10MEL58	CO1	3	2		3						1		
	CO2	3	2		3						1		
	CO3	3	2		3						1		
	CO4	3	2		3						1		
10ME61	CO1	2	1						1		1	1	
	CO2	2	2						1		1	1	
	CO3	1	1						1		1	1	
	CO4	2	2						1		1	1	
10ME62	CO1	3	2	3		1			3				3
	CO2	3	2	3		1			3				3
	CO3	3	2	3		1			3				3
	CO4	3	2	3		1			3				3
10ME63	CO1	3	3	2							1		
	CO2	3	3	2							1		
	CO3	3	3	2							1		
	CO4	2	3	3							1		
10ME64	CO1	3	3	2			1		1		1	1	
	CO2	3	3	2			1		1		1	1	
	CO3	3	3	2			1		1		1	1	
	CO4	3	3	2			1		1		1	1	
10ME65	CO1	2						3			1	1	
	CO2	3						3			1	1	
	CO3	2						3			1	1	
	CO4	3						3			1	1	
10ME665	CO1	3	3			2					1		
	CO2	3	3			2					1		
	CO3	3									1		
	CO4	3									1		
10MEL67	CO1	3	2		3						1		
	CO2	3	2		3						1		
	CO3	3	2		3						1		
	CO4	3	2		3						1		
10MEL68	CO1	3	2	3		1			2				2

	CO2	3	2	3		1			2				2
10ME71	CO1	2	1						1		1	1	
	CO2	1	2						1		1	1	
	CO3	1	1						1		1	1	
10ME72	CO1	3	3	3			1		1		2	3	
	CO2	3	3	3			1		1		2	3	
	CO3	3	3	3			1		1		2	3	
	CO4	3	3	3			1		1		2	3	
10ME73	CO1	3	3	2			1		1		2	1	
	CO2	2	2				1		1		2	1	
	CO3	2	2				1		1		2	1	
	CO4	2	2				1		1		2	1	
10ME74	CO1	3	2	2			1		1		1	1	
	CO2	3	2	2			1		1		1	1	
	CO3	3	2	2			1		1		1	1	
	CO4	3	2	2			1		1		1	1	
10ME754	CO1	1		2	1		2	3	3		1	2	1
	CO2	2		3	1		2	3	3		1	3	1
	CO3	1		3	2		2	3	3		1	2	1
	CO4	1		1	2		2	3	3		1	2	1
10ME761	CO1	3		3	3	2		2	3			1	
	CO2	3		2	1	3		3	3			3	
	CO3	2		3	3	1		2	2			1	
	CO4	3		1	2	3		3	1			1	
10MEL77	CO1	3	2	2	3						1		
	CO2	3	2	2	3						1		
	CO3	3	2	2	3						1		
	CO4	3	2	2	3						1		
10MEL78	CO1	2	2	2	3	3			1	2	1		2
	CO2	2	2	2	3	3			1	2	1		2
10ME81	CO1	2	1						1		1	1	
	CO2	1	2						1		1	1	
	CO3	1	1						1		1	1	
	CO4	1	1						1		1	1	
10ME82	CO1	3	3	2			1		1		2	1	
	CO2	2	2				1		1		2	1	
	CO3	2	2				1		1		2	1	

	CO4	2	2				1		1		2	1	
10ME833	CO1						3	2			2	1	
	CO2	1	1				3	2			3	1	
	CO3						3	2			3	1	
10ME844	CO1	2		3	2			2	2			2	
	CO2	2		2	2			3	1			2	
	CO3	3	3	2	3			2	2			1	
	CO4	3		2	3			2	2			3	
10ME85	CO1	2	2	3	2	1	1	1	1		3	2	3
	CO2	2	2	3	2	1	1	1	1		3	2	3
	CO3	2	2	3	2	1	1	1	1		3	2	3
	CO4	2	2	3	2	1	1	1	1		3	2	3
10ME86	CO1	2	2	3	2	1	1	1	1		3	2	3
	CO2	2	2	3	2	1	1	1	1		3	2	3
	CO3	2	2	3	2	1	1	1	1		3	2	3
	CO4	2	2	3	2	1	1	1	1		3	2	3

Percentage of PO attainment with respect to the curriculum												
Average of Pos	373	300	215	118	72	104	80	144	33	194	139	56
Maximum marks	486	486	486	486	486	486	486	486	486	486	486	486
Percentage of PO attainment	76.75%	61.73%	44.24%	24.28%	14.81%	21.40%	16.46%	29.63%	6.79%	39.92%	28.60%	11.52%



The correlation of level of each POs have been derived by faculty who are expert in that particular subject. These correlation levels of all the subjects pertaining to mechanical engineering have been mapped with the POs.

To identify the target to be achieved by the faculty with respect to the curriculum and to identify the curriculum gaps, the percentage of attainability with respect to the POs as shown in the graph above.

CO/PSO Matrices.

Subject Code	COs	Program Specific Outcomes (PSOs)	
		PSO-1	PSO-2
10ME32A	CO1	3	
	CO2	3	3
	CO3	3	2
	CO4	3	1
10ME33	CO1	3	3
	CO2	3	3
	CO3	3	3
10ME34	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME35	CO1	3	1
	CO2	3	1

	CO3	3	1
	CO4	3	1
10ME36A	CO1	3	3
	CO2	3	3
	CO3	3	2
	CO4	3	2
10MEL37A	CO1	3	3
	CO2	3	3
	CO3	3	3
10MEL38A	CO1	3	3
	CO2	3	3
	CO3	3	3
10ME42B	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME43	CO1	3	3
	CO2	3	3
	CO3	3	3
10ME44	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME45	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME46B	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10MEL47B	CO1	3	3
	CO2	3	3
	CO3	3	3
10MEL48B	CO1	3	3
	CO2	3	3
10AL51	CO1	1	2
	CO2	1	2
	CO3	1	2

	CO4	1	2
10ME52	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME53	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME54	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME55	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME56	CO1	3	3
	CO2	3	3
	CO3	3	3
10MEL57	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10MEL58	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME61	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME62	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME63	CO1	3	3
	CO2	3	3
	CO3	3	3

	CO4	3	3
10ME64	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME65	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME665	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10MEL67	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10MEL68	CO1	3	3
	CO2	3	3
10ME71	CO1	3	3
	CO2	3	3
	CO3	3	3
10ME72	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME73	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME74	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME754	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME761	CO1	3	3

	CO2	3	3
	CO3	3	3
	CO4	3	3
10MEL77	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10MEL78	CO1	3	3
	CO2	3	3
10ME81	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME82	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME833	CO1	3	3
	CO2	3	3
	CO3	3	3
10ME844	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME85	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3
10ME86	CO1	3	3
	CO2	3	3
	CO3	3	3
	CO4	3	3

3.1.3. Program level Course-PO matrix of all courses INCLUDING first year courses (10)

Semester I

Sl no	Subject code	PO's											
		Po 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	15EME14/24	2	2				1	1		1	1	1	
2	15WSL16/26	1		2		2	1		1	1	1	1	

Semester II

Sl. no	Subject code	PO's											
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	15CED14/24	1	2	2	1	2			1		1		
2	15WSL16/26	1		2		2	1		1	1	1	1	

Semester III

Sl.no	Subject code	PO's											
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	10ME32A	3	2	1	2	1	1	1	2	1		2	
2	10ME33	3	3	3			1			1	1	1	
3	10ME34	3	3	2			1		1		1	1	
4	10ME35	2	1				1		1		2	1	
5	10ME36	1	3	3		3			1		2		
6	10MEL37A	3	2	1	1	1		2	2	2	1	1	
7	10MEL38A	2	2	2	2	1			1	2	1	1	

Semester IV

Sl.no	Subject code	PO's											
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	10ME42B	3	2			2					1	1	
2	10ME43	2	2	1			1		1		1	1	
3	10ME44	3		3			1		1		2	1	
4	10ME45	3	2			1					1		
5	10ME46B	3	3	1							1		
6	10MEL47B	2	3	2	1	1			2	2	1	1	
7	10MEL48B	2	2	2	2	1			1	2	1	1	

Semester V

Sl.no	Subject code	PO's											
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	10AL51	1					3	2	1	1	3	1	2
2	10ME52	3	3	2			1		1		1	1	
3	10ME53	1	1				3	2			2		
4	10ME54	3	3	3	2		2	2	2			2	
5	10ME55	2	1	1		1					1		
6	10ME56	3	3	1			1		1		1	1	
7	10MEL57	3			3						1		
8	10MEL58	3	2		3						1		

Semester VI

Sl.no	Subject code	PO's											
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	10ME61	2	2						1		1	1	
2	10ME62	3	2	3		1			3				3
3	10ME63	3	3	3							1		
4	10ME64	3	3	2			1		1		1	1	
5	10ME65	3						3			1	1	
6	10ME665	3	2			1					1		
7	10MEL67	3	2		3						1		
8	10MEL68	3	2	3		1			2				2

Semester VII

Sl.no	Subject code	PO's											
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	10ME71	2	2						1		1	1	
2	10ME72	3	3	3			1		1		2	3	
3	10ME73	3	3	1			1		1		2	1	
4	10ME74	3	2	2			1		1		1	1	
5	10ME754	2		3	2		2	3	3		1	3	1
6	10ME761	3		3	3	3		3	3			2	
7	10MEL77	3	2	2	3						1		
8	10MEL78	2	2	2	3	3			1	2	1		2

Semester VIII

Sl.no	Subject code	PO's											
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
1	10ME81	2	2						1		1	1	
2	10ME82	3	3	1			1		1		2	1	
3	10ME833	1	1				3	2			3	1	
4	10ME838			1			2	1				1	
5	10ME844	3	1	3	3			3	2			2	
6	10ME85	2	2	3	2	1	1	1	1		3	2	3
7	10MEL86	2	2	3	2	1	1	1	1		3	2	3

Subjects Mapping with PSOs

Courses	PEO1	PEO2
10ME32A	**3**	**3**
10ME33	**3**	**3**
10ME34	**3**	**3**
10ME35	**3**	**3**
10MEL36A	**3**	**3**
10MEL37A	**3**	**3**
10MEL38A	**3**	**3**
10MAT41	**3**	**3**

10ME42B	**3**	**3**
10ME43	**3**	**3**
10ME44	**3**	**3**
10ME45	**3**	**3**
10ME46B	**3**	**3**
10MEL47B	**3**	**3**
10MEL48B	**3**	**3**
10AL51	**1**	**2**
10ME52	**3**	**3**
10ME53	**3**	**3**
10ME54	**3**	**3**
10ME55	**3**	**3**
10ME56	**3**	**3**
10MEL57	**3**	**3**
10MEL58	**3**	**3**
10ME61	**3**	**3**
10ME62	**3**	**3**
10ME63	**3**	**3**
10ME64	**3**	**3**
10ME65	**3**	**3**
10ME665	**3**	**3**
10MEL67	**3**	**3**
10MEL68	**3**	**3**
10ME71	**3**	**3**

10ME72	**3**	**3**
10ME73	**3**	**3**
10ME74	**3**	**3**
10ME754	**3**	**3**
10ME761	**3**	**3**
10ME762	**3**	**3**
10MEL77	**3**	**3**
10MEL78	**3**	**3**
10ME81	**3**	**3**
10ME82	**3**	**3**
10ME833	**3**	**3**
10ME838	**3**	**3**
10ME844	**3**	**3**
10ME85	**3**	**3**
10ME86	**3**	**3**

3.2 Attainment of course out comes

3.2.1 Describe the assessment process use together the data up on which the evaluation of courses outcome based (10)

The assessment process used to evaluate course outcome is mainly internal assessment and university examination of theory and practical in which weightage of 80% to university examination and 20% to internal test. Assignment and quizzes are given to improve the internal and university exam result. They are not considered for attainment of Cos, POs and PSOs .

- The DAC committee have created a Excel spread sheet to assess the course outcomes and Program outcomes
- The faculty members then keep the POs in front of them develop COs (2-3 for each course) and then break each of their unit outcome into elements of Bloom's Taxonomy and define set of attributes for each outcome.
- Internal marks are mapped with COs. Each faculty pre- sets out targets for assessment of course outcomes. The Excel sheet calculates the attainment for each outcome.
- For assessment of POs ,the attainment obtained from the internal marks and Final Examination marks are considered
- Each outcome is assessed in several courses to ensure that students acquire an appropriate level in terms of knowledge/skills of an outcome (also provided in the table below)
- The Program DAC studies the course analysis report of each faculty and decides course of corrective action if required.

The program outcomes are assessed with the help of course outcomes of the relevant courses through direct and indirect methods.

Direct measures are provided through direct examinations or observations of student knowledge or skills against measureable course outcomes.

The knowledge and skills described by the course outcomes are mapped to specific problems on internal exams/home assignment/group task. Throughout the semester the faculty records the performance of each student on each course outcome.

Finally, program outcomes are assessed with above mentioned data and Program Assessment Committee concludes the PO attainment level.

Program Outcomes Assessment and Attainment

PO1. Apply knowledge of mathematics and science, with fundamentals of Mechanical Engineering to be able to solve complex engineering problems related to ME.

Results of Assessment (Direct Measures)

For the Summative assessment conducted at the end of the semester/year internals, the decision was taken to focus on direct assessment by faculty for all indicators. The examination results conducted by the affiliating university were also evaluated by the faculty on each indicator. The Summative data information for performance indicator no 1 was gathered from Math courses where in students was given a project requiring them to choose the mathematical model which was appropriate for a specific problem.

For performance indicator no 2, faculty created an internal test which required students to apply mathematical principles to model equations to achieve solutions. The student performance in the test was recorded by the faculty. The faculty also evaluated university questions at the end of the semester dealing with performance indicator no 1 and 2 and document specific areas of strength and weakness related to the indicators.

For performance indicator no 3, project report rubric was used by faculty to analyze the project report for evidence of consideration of multiple approaches.

The results of the assessment were extensively discussed by faculty and it was recommended to the IACC that additional formative assessment may be included in the semester through short quiz, tests and assignments.

PO2. Apply mathematical foundations and Mechanical Engineering principles in the modelling and design of Mechanical Engineering Components in a way that demonstrates comprehension of tradeoffs involved in design choices.

Results of Assessment (Direct Measures)

For the Summative assessment conducted at the end of the semester/year internals, the decision was taken to focus on direct assessment by faculty for all indicators. The examination results conducted by the affiliating university were also evaluated by the faculty on each indicator. The Summative data information for performance indicator no 1 and no 2, faculty created an internal test for Math courses

like 10MAT11, 10MAT21, 10MAT31, 10MAT41, 10ME34, 10ME44 which required students to apply mathematical principles to model equations to achieve solutions, and for computer science fundamental courses like 10EME14/24, 10ME34, 10ME44, which required students to apply Mechanical Engineering theory in the modelling and design of computer based problems. The student performance in the test were recorded by the faculty also evaluated university questions at the end of the semester dealing with performance indicator no 1 and 2 and document specific areas of strength and weakness related to the indicators.

For performance indicator no 2.Summative data for indicators were collected in the lab courses like 10MEL37, 10MEL38, 10MEL47, 10MEL48, 10MEL57, 10MEL57 where the students are required to perform a set of experiments prescribed by the university. In addition to those experiments the faculty members asked student to give solution for similar kind of problems and problems involving fundamentals of computer science and assessed the ability of students by awarding marks

The results of the assessment were extensively discussed by faculty and it was recommended to the IACC that additional formative assessment may be included in the semester through short quizzes for 10ME34, 10ME54,and to provide the students specific feedback on indicators No 1 & 2. . The current year, strategy will include more such activities.

PO3. Analyze a problem, identify and define the computing requirements appropriate to its solution.

Results of Assessment (Direct Measures)

For the summative assessment at the end of the program, the decision was made to focus on the faculty's direct assessment for all indicators. In this course students completed lab experiments where they required to develop laboratory reports. The scoring rubric for indicator No 1 was completed by the laboratory teaching assistants to assess student performance through observations; rubrics for indicators No2 were completed by the faculty.

The assessment results were evaluated by the faculty during the year end focus group discussions. Based on the analysis the faculty recommended additional formative assessment to provide the students the rubrics for indicators No 2 and give them formal feedback making their scores as part of the grade where appropriate. For indicator No 1, Laboratory Teaching Assistants were asked to attend a seminar on how to observe students in the laboratory and complete the rubric for lab practices and

the use of instruments. Based on results, faculty members were asked to provide the scoring rubrics with the appropriate lab assignments so students could see how they would be evaluated.

PO4. Design and development principles in the construction of software systems of varying complexity.

Results of Assessment (Direct Measures)

For the summative assessment at the end of the program, the decision was made to focus on the faculty's direct assessment for all indicators. Summative data for indicators No1 and 2 were collected in the 10MEL67 course. In this course students completed Model and Analysis where they required to develop analysis reports. The scoring rubric for indicator No 1 was completed by the laboratory teaching assistants to assess student performance through observations; rubrics for indicators No 2were completed by the faculty.

The assessment results were evaluated by the faculty during the year end focus group discussions. Based on the analysis the faculty recommended additional formative assessment. For indicator No 1, Laboratory Teaching Assistants were asked to attend a seminar on how to observe students in the laboratory and complete the rubric for lab practices and the use of instruments. Based on results, faculty members were asked to provide the scoring rubrics with the appropriate lab assignments so students could see how they would be evaluated.

PO5. Design, implement, and evaluate a software or a Mechanical Engineering component, or process to meet desired needs within realistic constraints such as time, efficiency, as well as appropriate constraints related to economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability considerations

Results of Assessment (Direct Measures)

For the summative assessment at the end of the program, the decision was made to focus on the faculty's direct assessment for all indicators. Summative data for indicators No1 and 2 were collected in the 10MEL36course. In this course students completed experiments where they required to develop laboratory reports. The scoring rubric for indicator No 1 was completed by the laboratory

teaching assistants to assess student performance through observations; rubrics for indicators No 2 were completed by the faculty.

The assessment results were evaluated by the faculty during the year end focus group discussions. Based on the analysis the faculty recommended additional formative assessment asking faculty members teaching 10ME34 theory and Lab 10MEL37 to provide the students the rubrics for indicators No 2 and give them formal feedback making their scores as part of the grade where appropriate. For indicator No 1, Laboratory Teaching Assistants were asked to attend a seminar on how to observe students in the laboratory and complete the rubric for lab practices and the use of instruments. Based on results, faculty members were asked to provide the scoring rubrics with the appropriate lab assignments so students could see how they would be evaluated.

PO6. Use the techniques, skills, and modern engineering tools necessary for practice as a Mechanical professional

Results of Assessment (Direct Measures)

For the summative assessment end of the decision was made to focus on faculty's Direct assessment for all indicators and analysis of university results. Summative data for Indicators No 1was collected in the course 10ME35,10ME45 and course. In this course students completed experiments where they required to develop laboratory reports. The scoring rubric for indicator No 1 was completed by the laboratory teaching assistants to assess student performance through observations; rubrics for indicators No 2 were completed by the faculty. A rubric was used to score their responses related to indicator No 1.

PO7. Work effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary environment.

Results of Assessment (Direct Measures)

For the summative assessment end of the program (internal as well as assessment of student performance in university examinations, the decision was made to focus on faculty's direct assessment for all indicators and analysis of university results. Summative data for Indicators No 1 and 2 were collected in 10ME64 and 10ME72 course respectively. In this course students were asked to develop a concept paper that included a search of the literature and demonstrate knowledge of contemporary issues. This course was chosen because students complete the project independently

and the program could get a clearer picture of students' to demonstrate knowledge of contemporary issues.

To identify the importance of understand and discuss the societal and contemporary issues as part of Program level statistics and survey reports are considered.

At the end of every academic year annual report is developed where the statistics of students who have participated in professional bodies/ student chapters/workshops/seminars/conferences/paper presentations/internships/industry visit etc.. is prepared.

PO8. Demonstrate knowledge of contemporary issues and understand professional, ethical, legal, security and social issues and responsibilities

Results of Assessment (Direct Measures)

For the summative assessment end of the decision was made to focus on faculty's Direct assessment for all indicators and analysis of university results. Summative data for Indicators No 1was collected in the course 10AL51 course. In this course students completed experiments where they required to develop laboratory reports. The scoring rubric for indicator No 1 was completed by the laboratory teaching assistants to assess student performance through observations.

Graduates are intended to understand ethics and professional conduct related to ME and should be able to identify the legal issues related to patents, plagiarism etc..To achieve this as a part of curriculum, extra curriculum aspects are considered.

PO9. Analyze the local and global imDACt of computing on individuals, organizations, and society

Results of Assessment (Direct Measures)

Team work has always been common element in engineering learning. This Indicator 1, 2 & 3 are evaluated by developing the professional skills which includes responsible teamwork, creativity and communication skills with professional and to prepare them for the complex actual work environment and for life-long learning.

The indicator 4 is accessed through the tabulated courses that are part of the curriculum using direct and indirect assessment tools Laboratory experiments, Major Project and home assignments are conducted for the courses 10ME62 and 10ME64.These are complex and are generally entailed

coordinated planning and execution. Teams of approximately Two, Three and Four students are formed to accomplish the assigned project task. The predefined rubric is used to assess these courses. From the result, it is observed there is good team work among all the team members .

The rubric considers planning, sharing, listening, and other aspects of team work. As appropriate, findings from course end survey, graduate survey and alumni surveys and discussions were compiled to determine how well graduates are performing relative to this outcome. The assessments for all students in the program were collected and analyzed with a focus on individual work and on teams to accomplish common goals.

PO10. Demonstrate knowledge and understanding of the engineering and management principles including financial implications and apply these to his/her work, as a member and leader in a team, and to manage project work as part of a multidisciplinary team.

Results of Assessment (Direct Measures)

Team work has always been common element in engineering learning. The indicator 1, 2 and 3 is evaluated by developing the professional skills which includes responsible leadership role, teamwork, creativity and communication skills with professional and to prepare them for the complex actual work environment and for life-long learning. The attainment of these can be accessed through the tabulated courses that are part of the curriculum using direct assessment tools. The indicator 4 will gives Laboratory experiments. These laboratory exercises are complex and are generally entailed coordinated planning and execution. Teams one, two, three, and four students are formed to accomplish the assigned laboratory task. The predefined rubric is used to assess these courses. From the result, it is observed there is good team work among all the team members. The rubric considers planning, sharing, listening, and other aspects of team work. As appropriate, findings from course end survey, graduate survey and alumni surveys and discussions were compiled to determine how well graduates are performing relative to this outcome. The assessments for all students in the program were collected and analyzed with a focus on individual work and on teams to accomplish common goals.

PO11. Communicate effectively in both verbal and written forms.

Results of Assessment (Direct Measures)

The indicator 1 gives the ability of the students to communicate effectively is assessed regularly during the program through various courses. The communication abilities are broadly categorized into oral and written communication skills. Precisely, these abilities are assessed over the tabulated courses during the program using appropriate assessment tools for each course. In addition to these courses, these abilities are also assessed by the faculty in other courses when students present the seminars and write the home assignments. Measurements considered under this section to assess the PO are:

- Number of students participated in various extracurricular activities like Workshops, Seminars, Paper Presentations, and Technical Quiz etc.
- Number of students participated in entrance examinations like GATE,TOFEL, IELTS etc.,
- Conducting pre-placement training to the students.

At the end of every academic year annual report is developed where the statistics of students who have participated in pre-placement training/ professional bodies/ student chapters/ workshops/ seminars/ conferences /paper presentations/internships/industry visit/TOFEL/GATE/IELTS etc. is prepared.

In addition, the number of students participated in various extracurricular activities like workshops, paper presentations conducted at various institutions and our institute is collected at end of the each academic year. This data is used for communication abilities assessment. Also, the number of students appeared and qualified for GATE/TOEFL/IELTS entrance exams were used for the assessment of the outcome.

PO12. Recognize the need for, and be motivated to engage in life-long learning and continuing professional development.

Results of Assessment (Direct Measures)

The ability of the students to identify and use information sources by her/himself to prepare term papers and develop mini and major projects in general for curriculum based courses are considered for assessing lifelong learning capabilities. Precisely, these abilities are assessed over the tabulated courses during the program using appropriate assessment tools for each course.

Importance to Lifelong learning skills is observed using tools during and after the program completion.

Independent identification of information resources and best utilization of it as a part of engaging in professional development is observed from courses ME52, ME54,ME62,ME64,ME72 and ME82.This aspect is measured in two dimensions and the rubric for assessing ME52, ME54,ME62,ME64,ME72 and ME82 are also provided. The student's participation in the following activities as part of Program level statistics and survey reports are considered.

- Membership and participation in Professional body activities
- Unsupervised projects done on the interest of students
- Participation in Paper presentations, workshops and seminars
- Internships/ Visits to industry
- Appearance and Qualification in GATE and PGCET

3.2.2 Record the attainment course outcomes of all courses with respect to set attainment levels

Measuring CO attainment through Internal Assessments: (The examples indicated are for reference only. Program may appropriately define levels)

Process for Attainment of CO
Weightage: University Exam - 80%
Internal Exam - 20%

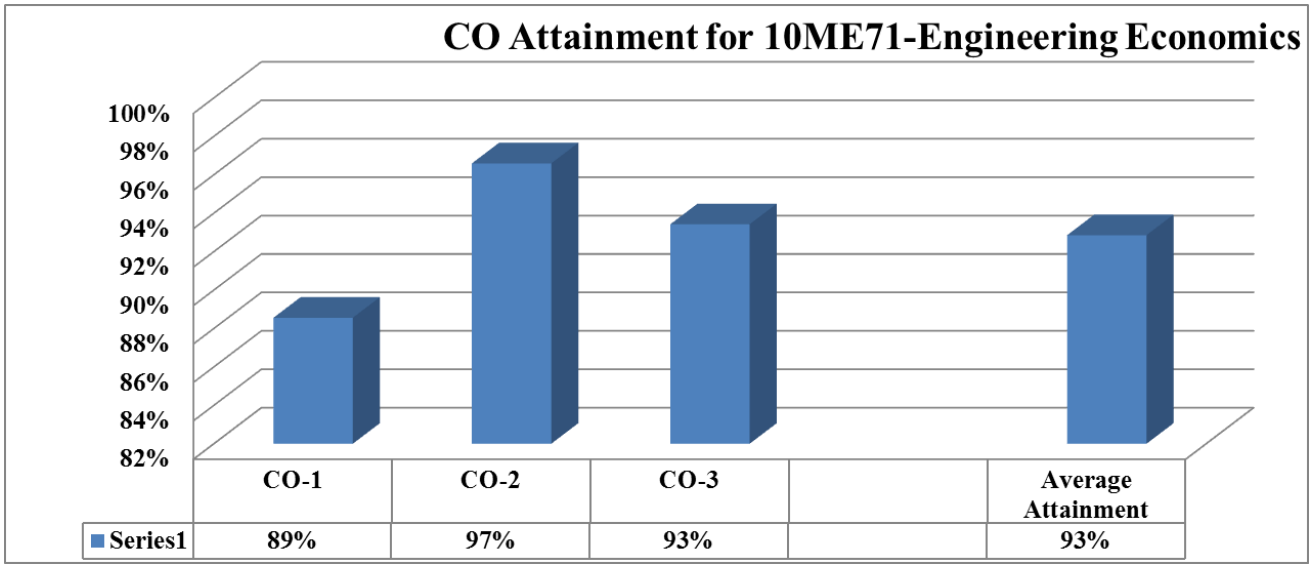
Definition of attainment level 1 60% students gets more than 50% in university exam and 60% in internal assessment marks

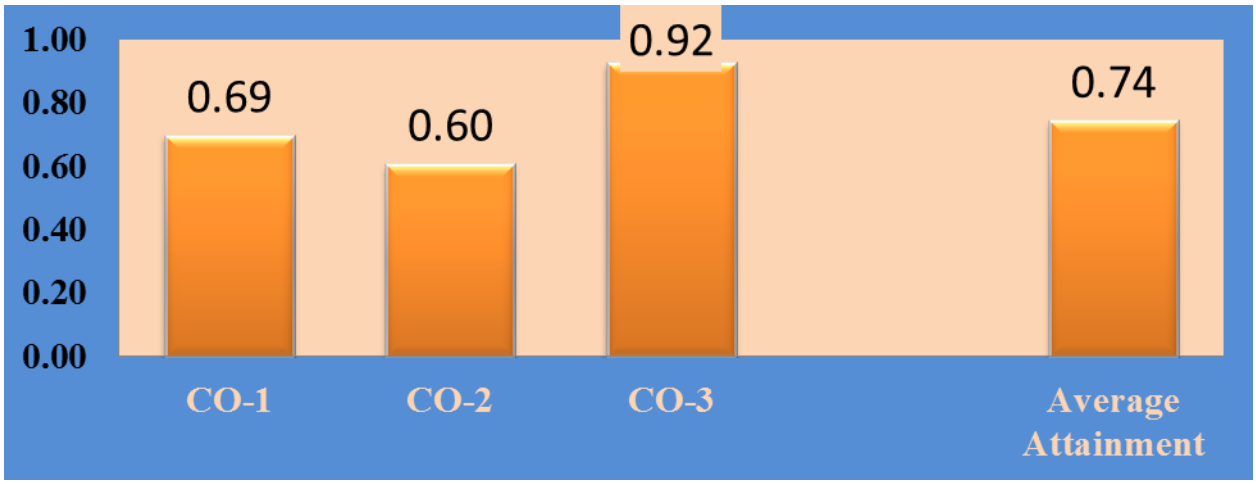
. **Attainment Calculation**
(No. of students above 50% in university exam/60% of total appeared)*3*0.8 +
(No. of students above 60% in Internal exam/60% of total appeared)*2*0.2
Required attainment level is **2.8** (i.e. =3*0.8+2*0.2). If the attainment level is less than 2.8 action plan as specified below is implemented.

Action plan:
Weak student's academic program:
Tutorials are conducted to find out the understanding level and guide them. Also extra classes are conducted to revise difficult concepts for weak students. Assignments are given so that the students will learn the concepts and seek clarification from teachers.

Attainment Level 1: **60%** students scoring more than 45% marks out of the relevant Maximum marks.

Courses	CO1	CO2	CO3	CO4
10ME32A	57.00%	52.60%	57.20%	50.20%
10ME33	53.84%	54.80%	55.02%	
10ME35	57.00%	59.20%	59.20%	60.20%
10ME43	45.00%	43.20%	49.80%	
10ME44	70.00%	71.00%	69.80%	72.80%
10ME52	41.60%	39.60%	43.20%	44.20%
10ME53	78.65%	78.85%	80.45%	79.85%
10ME62	48.00%	50.40%	46.80%	51.60%
10ME63	48.17%	49.77%	42.97%	49.17%
10ME64	77.15%	76.23%	77.95%	
10ME72	56.00%	55.80%	55.20%	58.80%
10ME82	65.74%	65.77%	60.93%	65.73%





3.3 Attainment of Program Outcomes and Program Specific Outcomes

3.3.1. Describe Assessment tools and Process used for measuring the attainment of each of the program outcomes and program specific outcomes

3.3 Attainment of Program Outcomes and Program Specific Outcomes

3.3.1. Describe Assessment tools and Process used for measuring the attainment of each of the program outcomes and program specific outcomes (10)

In Outcome based Education, assessment done through one or more than one processes, carried out by the institution, that identify, collect, and prepare data to evaluate the achievement of programme educational objectives, program outcomes and course objectives and outcomes.

PO Assessment Tools

Assessment tools are categorized into direct and indirect methods to assess the programme educational objectives, program outcomes and course outcomes.

Direct methods display the student's knowledge and skills from their performance in the continuous assessment tests, end–semester examinations, presentations, and classroom assignments etc. these methods provide a sampling of what students know and/or can do and provide strong evidence of student learning.

Indirect methods such as surveys and interviews ask the stakeholders to reflect on student's learning. They assess opinions or thoughts about the graduate's knowledge or skills and their valued by different stakeholders. The below table 2.13 shows the Direct assessment & Indirect assessment.

Table: Gives the Direct assessment & Indirect assessment.

Direct Assessment methods are formative as well as summative
For some of the POs that are abstract, rubrics has been designed using performance indicators and shared with the students in advance. This helps students understand against which parameter their work will be judged with the "scoring rules". These rubrics can be used by students in, revising, and judging their own work and progress.

Since an outcome can be achieved in more than one course, while assessing a specific outcome, numbers of courses are assessed and both core and electives course are assessed.

Use of Rubrics for Evaluation and Assessment of POs

The Course/Programme outcomes are difficult to measure such as assessing critical thinking, creativity, analytical skills, and problem solving etc. Hence the department has adopted Criterion Referenced Rubrics to assess the POs and COs wherever appropriate. The Rubric criteria are either developed by department faculty or sometimes even with consultation with students and distributed before an assignment, project or test.

Rubrics are used for both formative and summative assessment of students. Same rubric is used for assessing an outcome so that the faculty is able to assess student progress and maintain the record of the same for each student.

The rubrics are shared with students before being evaluated so that they are aware of the performance criteria and their weightage. Copies of Rubrics used for assessing POs are shown below table.

Program Outcome assessment process

For each outcome the ACP along with program and course coordinators define performance indicators (Assessment criteria) and their targets. Each performance indicator is aligned to the courses and targets set for each performance indicator. This is indicated in the table.

The faculty members then keep the POs in front of them develop COs (4-5 for each course) and then break each of their unit outcome into elements of Bloom's Taxonomy and define set of attributes for each outcome. These are used for planning lectures, assignments, tests, projects etc while developing their course files.

Each outcome is assessed in several courses to ensure that students acquire an appropriate level in terms of knowledge/skills of an outcome.

The course coordinators collect the qualitative and quantitative data and use these for outcome assessment in a continual process.

Each faculty pre- sets out targets for assessment of course outcomes and prepares analysis of their course outcome based on student performance, their own assessment and student feedback and present the same to the ACP along with his/her suggestion for improvement. The course assessment is done at both formative and summative levels.

The Program ACP studies the course analysis report of each faculty and decides course of corrective action if required.

ACP designs the survey questionnaires along with targets against which the POs are to be assessed and planned schedule for their assessment and submits the same to the IACC for initiating action of sending out survey instruments to relevant alumni, employers and other external stakeholders.

The IACC initiates action of indirect assessment of POs based on the pre-defined and agreed schedule with each ACP.

The ACP analyzes the collected data. If the assessment meets the performance targets the outcome is attained. Otherwise, corrective actions are initiated and results presented to the IACC which then presents the same to Academic Advisory Board and seeks their suggestions and approval for corrective action.

While all Pos will be assessed through course outcomes at the end of every semester (Direct assessment) through evaluation of student performance in various courses aligned to a specific PO, the assessment of overall POs through indirect method will be done annual basis.

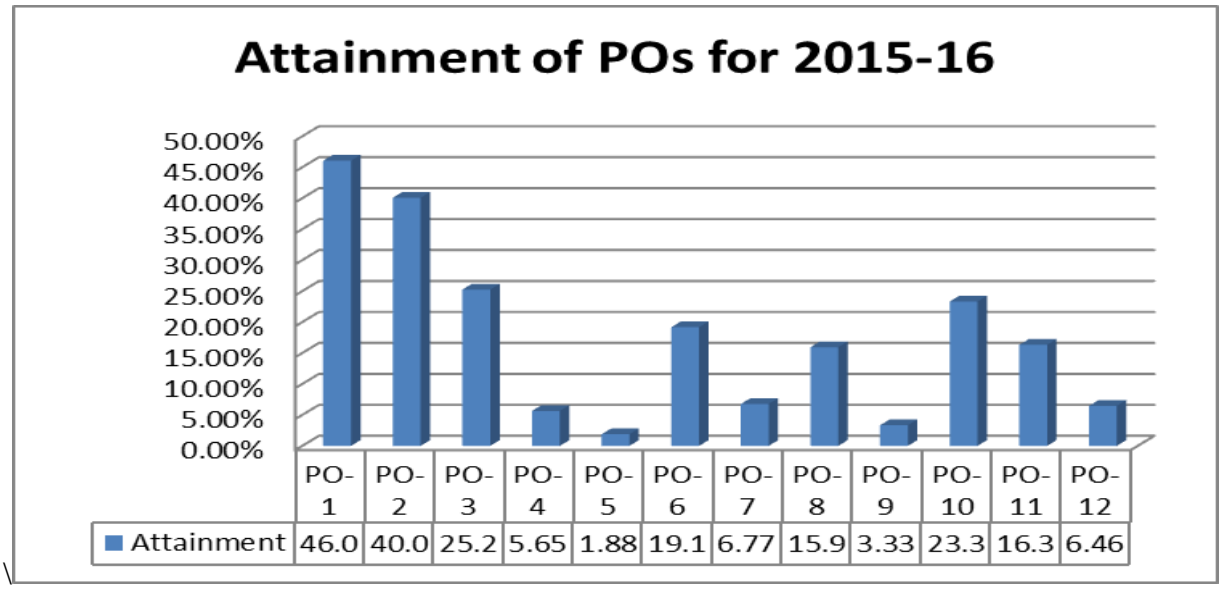
3.3.2. Provide the results of evaluation of each PO and PSOs (40)

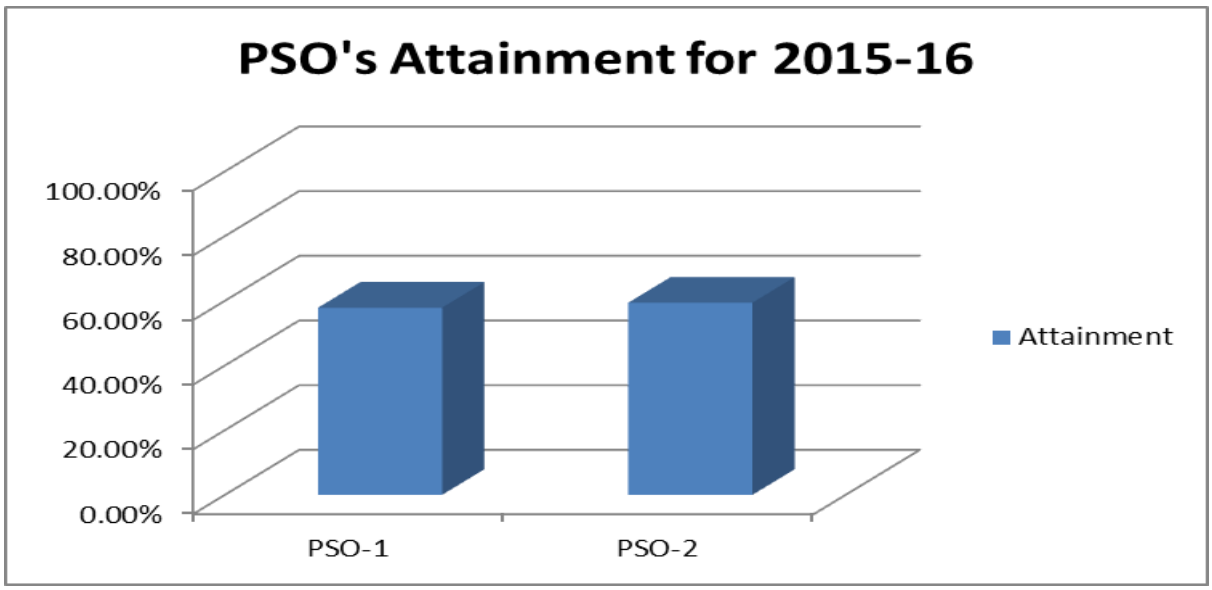
The expected level of attainment for each of the Program Outcomes;

The program outcomes are assessed with the help of course outcomes of the relevant Courses through direct and indirect methods.

Direct Assessment Method:

Direct measures are provided through direct examinations or observations of student knowledge or skills against measureable course outcomes. The knowledge and skills described by the course outcomes are mapped to specific problems on internal exams/home assignment/group task. Throughout the semester the faculty records the performance of each student on each course outcome. At the end of the semester students receive grades from external exams.





Indirect Assessment Method:

Indirect assessment strategies are implemented by embedding them in the course end survey, Graduate survey and Alumni Survey. Finally, program outcomes are assessed with above mentioned data and Program Assessment Committee concludes the Po attainment level.

The evaluation POs is carried out with respect to student performance and surveys in both the terms of direct and indirect assessment methods.

- Direct method of assessment is based on assessment of PO on the achievements in the contributing courses for that particular PO.
- Indirect method of assessment is based on course exit survey, program exit survey, alumni survey, placement survey, feedback on facilities by students, parents survey and rubrics developed for project and seminar.
- The evaluation PSOs is carried out with respect to student performance and surveys in both the terms of direct and indirect assessment methods for the contributing courses mapped to the PSO.

In Outcome based Education, assessment done through one or more than one processes, carried out by the institution, that identify, collect, and prepare data to evaluate the achievement of programme educational objectives, program outcomes and course objectives and outcomes.

PO Assessment Tools

Assessment tools are categorized into direct and indirect methods to assess the programme educational objectives, program outcomes and course outcomes.

Direct methods display the student's knowledge and skills from their performance in the continuous assessment tests, end–semester examinations, presentations, and classroom assignments etc. these methods provide a sampling of what students know and/or can do and provide strong evidence of student learning.

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<tr><td colspan="2">Direct Assessment methods are formative as well as summative</td></tr>
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<tr><td>Assignments</td><td rowspan="3">The assignment, Quiz and class test are a qualitative performance assessment tool designed to assess students' knowledge of engineering practices, framework, and problem solving. An analytic rubric was developed to assess students' knowledge with respect to the learning outcomes associated with the scenario tool.</td></tr>
<tr><td>Quiz</td></tr>
<tr><td>Class test</td></tr>
<tr><td>Group discussion/ Brainstorming</td><td>This is designed to assess student's analytical capacity along with the capability to communicate with others.</td></tr>
<tr><td>Midterm exams</td><td rowspan="2">Midterm and semester End examination are metric for assessing whether all the POs are attained or not. Examination is more focused on attainment of course outcomes and program outcomes using a descriptive exam.</td></tr>
<tr><td>End semester exam (theory +</td></tr>
</table>

practical)	
Lab practical	This is mainly to assess student's practical knowledge with their designing capabilities.
Course Evaluation	At the end of every semester, students give feedback for the course taught to them. In this feedback survey students tell how effective course was in order to achieve POs.
Indirect Assessment methods	
Programme outcomes assessment report	At the end of every academic year annual report is developed where the statistics of students who have participated in professional bodies/ student chapters /workshops/seminars/conferences/paper presentations / internships /industry visit etc..is prepared. This statement is considered to indirectly assess the POs
Alumni Survey	Collect variety of information about program satisfaction, from graduate's end. –after every 2 years
Employer Survey	Provide information about our graduate's skills and capability. – after every 2 years
Student exit survey	To evaluate the success of programme in providing students with opportunities to achieve the programme outcome- every year

Since an outcome can be achieved in more than one course, while assessing a specific outcome, numbers of courses are assessed and both core and electives course are assessed.

Use of Rubrics for Evaluation and Assessment of POs

The Course/Programme outcomes are difficult to measure such as assessing critical thinking, creativity, analytical skills, and problem solving etc. Hence the department has adopted Criterion Referenced Rubrics to assess the POs and COs wherever appropriate. The Rubric criteria are either developed by department faculty or sometimes even with consultation with students and distributed before an assignment, project or test.

Rubrics are used for both formative and summative assessment of students. Same rubric is used for assessing an outcome so that the faculty is able to assess student progress and maintain the record of the same for each student.

The rubrics are shared with students before being evaluated so that they are aware of the performance criteria and their weightage. Copies of Rubrics used for assessing POs are shown below table.

Program Outcome assessment process

For each outcome the ACP along with program and course coordinators define performance indicators (Assessment criteria) and their targets. Each performance indicator is aligned to the courses and targets set for each performance indicator. This is indicated in the table.

The faculty members then keep the POs in front of them develop COs (4-5 for each course) and then break each of their unit outcome into elements of Bloom's Taxonomy and define set of attributes for each outcome. These are used for planning lectures, assignments, tests, projects etc while developing their course files.

Each outcome is assessed in several courses to ensure that students acquire an appropriate level in terms of knowledge/skills of an outcome.

The course coordinators collect the qualitative and quantitative data and use these for outcome assessment in a continual process.

Each faculty pre- sets out targets for assessment of course outcomes and prepares analysis of their course outcome based on student performance, their own assessment and student feedback and present the same to the ACP along with his/her suggestion for improvement. The course assessment is done at both formative and summative levels.

The Program ACP studies the course analysis report of each faculty and decides course of corrective action if required.

ACP designs the survey questionnaires along with targets against which the POs are to be assessed and planned schedule for their assessment and submits the same to the IACC for initiating action of sending out survey instruments to relevant alumni, employers and other external stakeholders.

The IACC initiates action of indirect assessment of POs based on the pre-defined and agreed schedule with each ACP.

The ACP analyzes the collected data. If the assessment meets the performance targets the outcome is attained. Otherwise, corrective actions are initiated and results presented to the IACC which then presents the same to Academic Advisory Board and seeks their suggestions and approval for corrective action.

While all Pos will be assessed through course outcomes at the end of every semester (Direct assessment) through evaluation of student performance in various courses aligned to a specific PO, the assessment of overall POs through indirect method will be done annual basis.

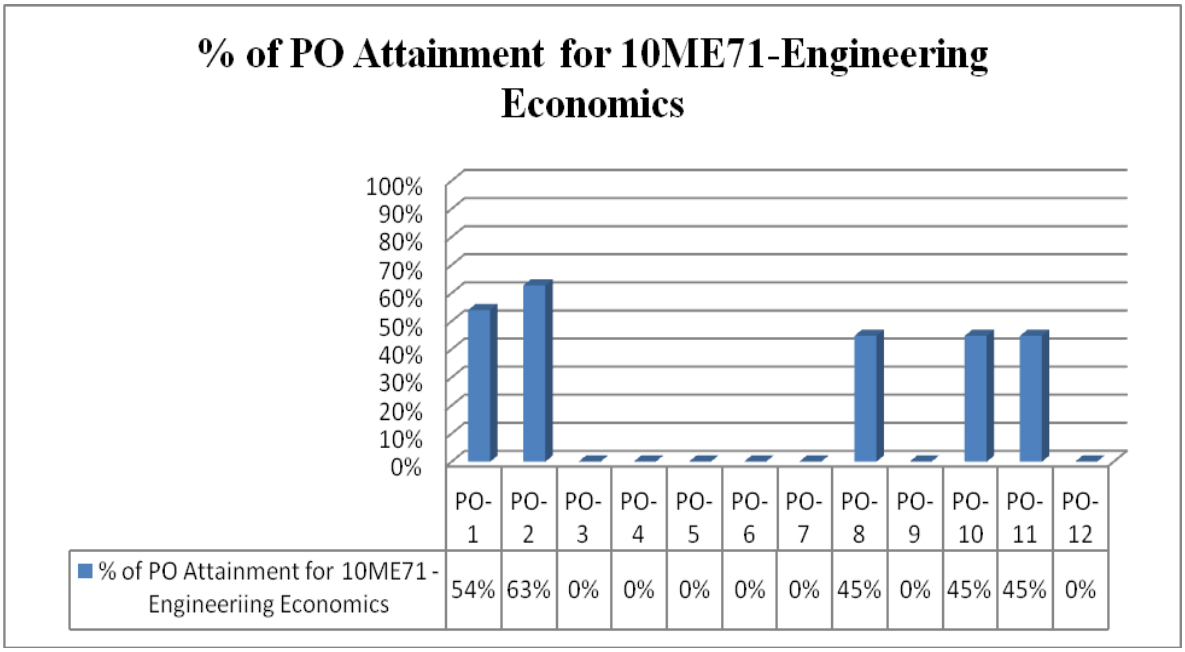
3.3.2. Provide the results of evaluation of each PO and PSOs

- **Department of mechanical engineering ACSCE has started outcome based education system from academic year 2015-2016**

Direct Method

- The DAC committee have created a Excel spreadsheet to assess the course outcomes and Program outcomes
- The faculty members then keep the POs in front of them develop COs (2-3 for each course) and then break each of their unit outcome into elements of Bloom's Taxonomy and define set of attributes for each outcome.
- Internal marks are mapped with COs. Each faculty pre- sets out targets for assessment of course outcomes. The Excel sheet calculates the attainment for each outcome.
- For assessment of POs ,the attainment obtained from the internal marks and Final Examination marks are considered
- Each outcome is assessed in several courses to ensure that students acquire an appropriate level in terms of knowledge/skills of an outcome (also provided in the table below)
- The Program DAC studies the course analysis report of each faculty and decides course of corrective action if required.

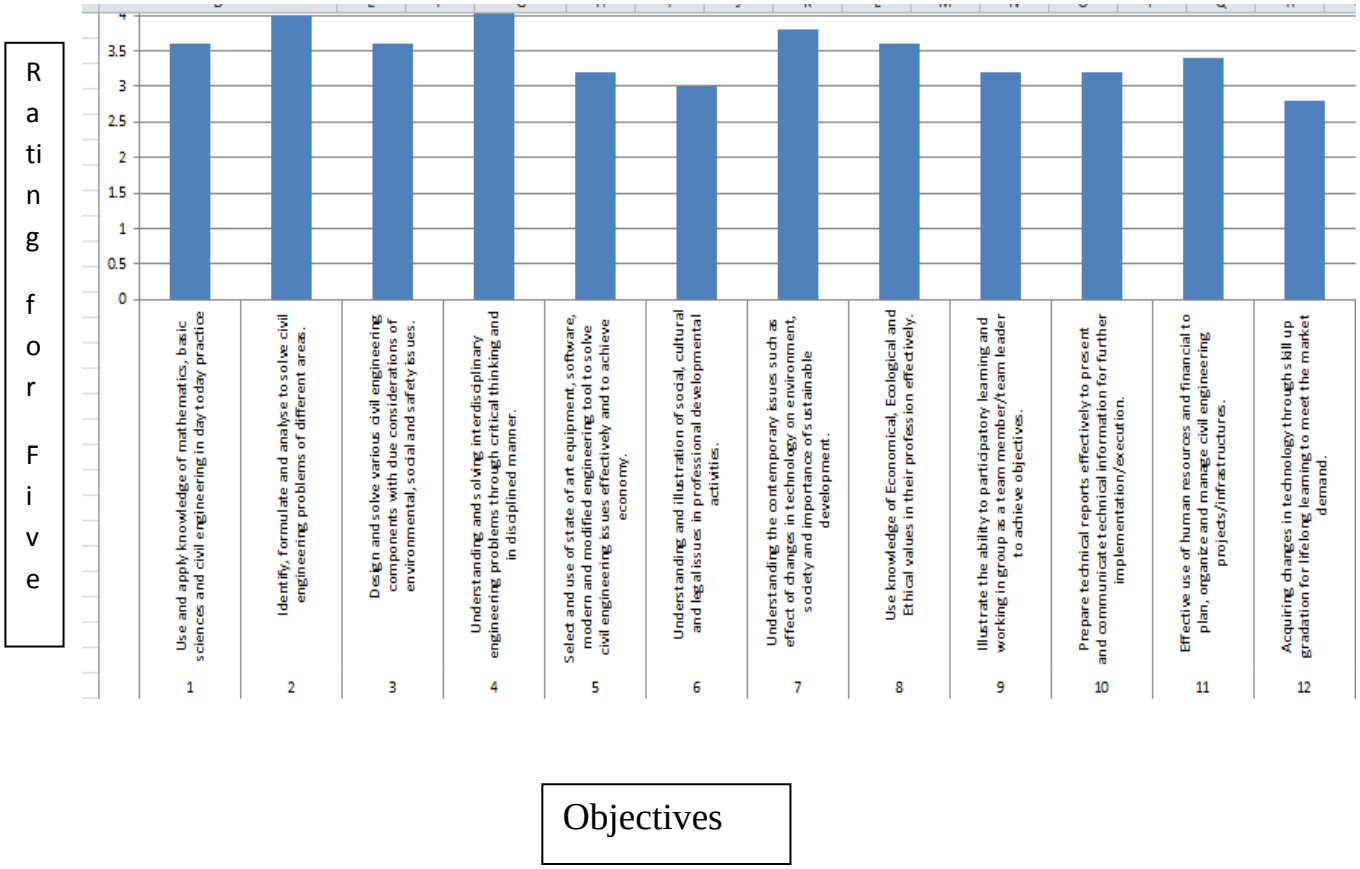
Example of assessment using direct method is has shown



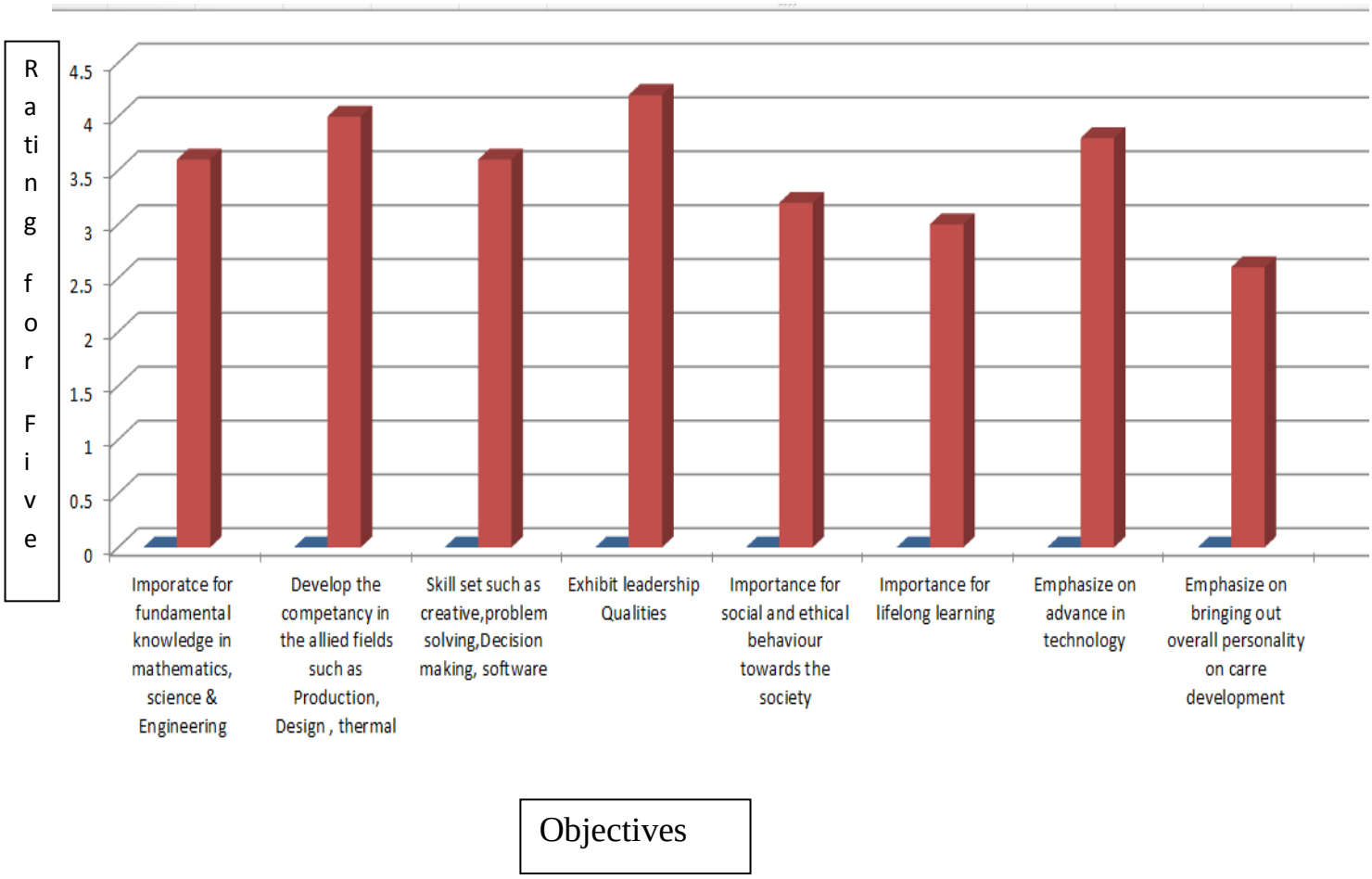
Indirect Method

- DAC collects the feedback on POs annually from the alumni, employer and Industry
- The DAC analyses the collected data. If the assessment meets the performance targets the outcome is attained. Otherwise, corrective actions are initiated and results presented to the IACC.

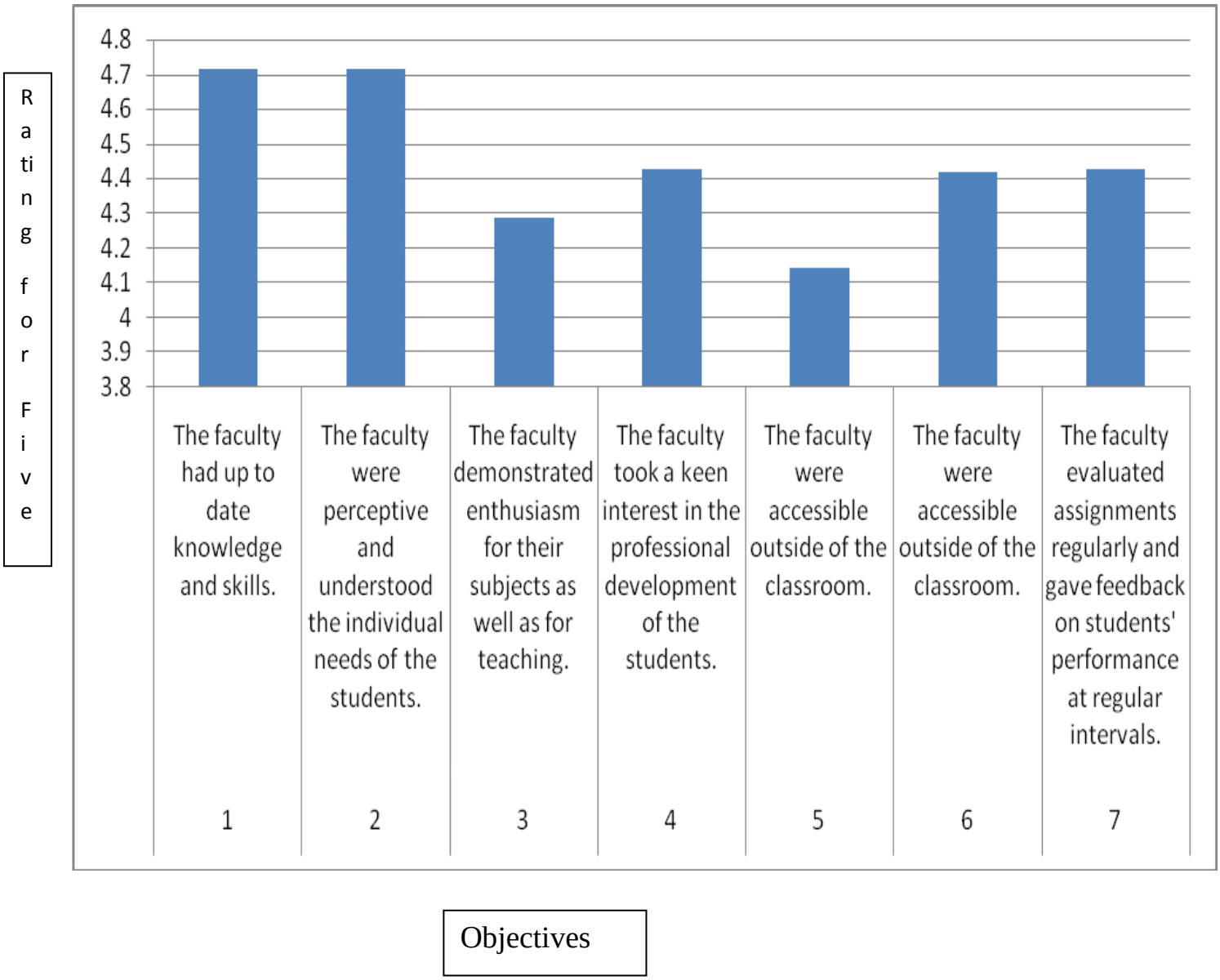
RUBRICS FOR DEFINING PROGRAM OUTCOMES



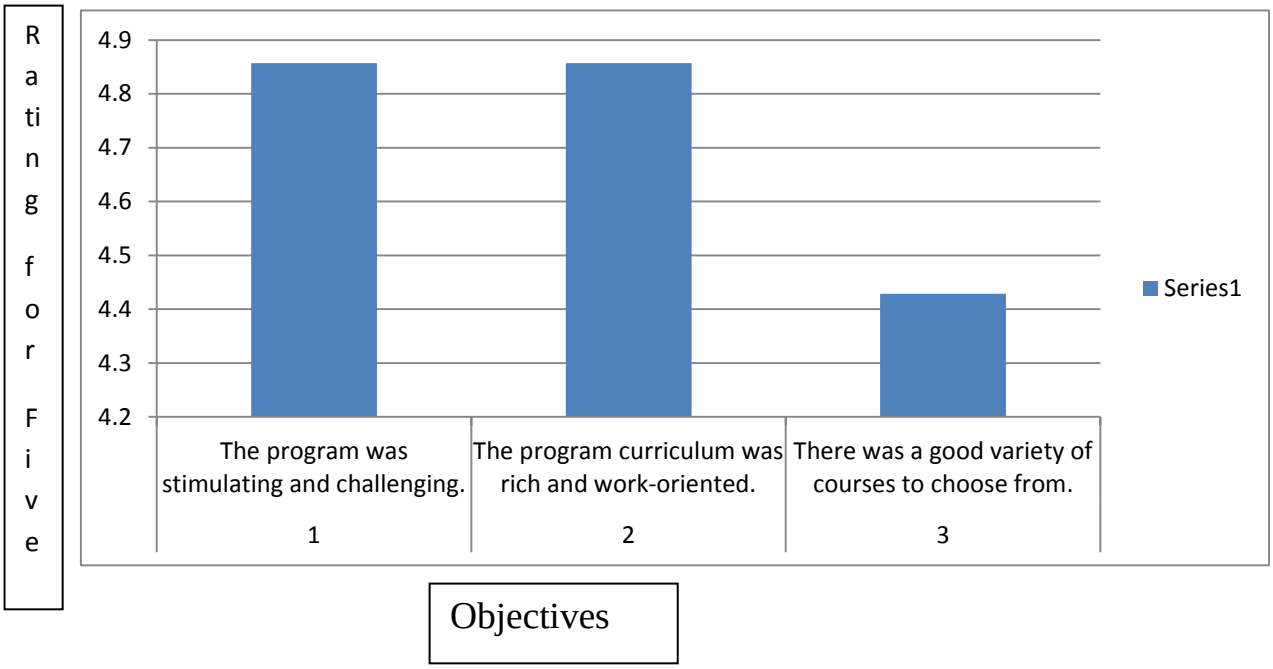
RUBRICS AND DEFINING PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)



STUDENT EXIT SURVEY (STATEMENT ON THE FACULTY)



STUDENT EXIT SURVEY (STATEMENT ON THE PROGRAM)



CRITERIA 4	Students' Performance	150

4. 1 Enrollment Ratio

Item **(Information to be provided cumulatively for all the shifts with explicit headings, wherever applicable)**	**CAY**	**CAY*m*1**	**CAY*m*2**
Sanctioned intake of the program (*N*)	60	60	60
Total number of students admitted in first year *minus* number of students migrated to other programs/institutions plus no. of students migrated to this program (*N*1)	44	51	44
Number of students admitted in 2nd year in the same batch via lateral entry (*N*2)	24	13	19
Separate division students, if applicable (N3)	03	03	02
Total number of students admitted in the Program (*N*1 + *N*2 + N3)	**71**	**67**	**65**

Year of entry	***N*1 + *N*2 + N3** **(As defined above)**	**Number of students who have successfully graduated without backlogs in any semester/year of study** **(Without Backlog means no compartment or failures in any semester/year of study)**			
		I Year	II Year	III Year	IV Year
CAY	56	--------	-------	------	-------
CAY*m*1	54	03	-------	------	-------
CAY*m*2	61	24	17	------	-------
CAY*m*3 (LYG)	68	14	14	10	04
CAY*m*4 (LYG*m*1)	52	04	10	07	07
CAY*m*5 (LYG*m*2)	78	21	22	17	16

Enrolment Ratio (20)
Enrolment Ratio= N1/N

Item (Students enrolled at the First Year Level on average basis during the period of assessment)	**Marks**
>=90% students enrolled	20
>=80% students enrolled	18
>=70% students enrolled	16
>=60% students enrolled	14
Otherwise	0

4.2 Success Rate in the stipulated period of the program (40)

4.2.1 Success rate without backlogs in any semester/year of study (25)

SI= (Number of students who have graduated from the program without backlog)/ (Number of students admitted in the first year of that batch and admitted in 2nd year via lateral entry and separate division, if applicable)

Average SI = Mean of Success Index (SI) for past three batch Success rate without backlogs in any year of study = 25 × Average SI

Item	Latest Year of Graduation, LYG (CAY*m*3)	Latest Year of Graduation minus 1, LYG*m*1 (CAY*m*4)	Latest Year of Graduation minus 2, LYG*m*2 (CAY*m*5)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	68	52	78
Number of students who have graduated without backlogs in the stipulated period	00	07	14+02
Success Index (SI)	00	0.1346	0.2051
Average SI	**0.1132 Success Rate= 25*.1131= 2.83**		

4.2.2 Success rate Success Rate with Backlogs in stipulated period (15)

SI= (Number of students who graduated from the program in the stipulated period of course duration)/ (Number of students admitted in the first year of that batch and admitted in 2nd year via lateral entry and separate division, if applicable)

Average SI = mean of Success Index (SI) for past three batches Success rate = 15 × Average SI

Item	LYG (CAY*m*3)	LYG*m*1(CAY*m*4)	LYG*m*2(CAY*m*5)
Number of students admitted in the corresponding First Year + admitted in 2nd year via lateral entry and separate division, if applicable	**68**	**52**	**78**
Success Rate with Backlogs	**57**	**46**	**54**
Success Index (SI)	**0.8382**	**0.8846**	**0.6923**
Average Success Index	**0.8050 Success Rate= 15*.8050= 12.0755**		

4.3 Academic Performance in Third Year (15)

*Academic Performance = 1.5 * Average API (Academic Performance Index)*

API *= ((Mean of 3rd Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks of all successful students in Third Year/10)) x (number of successful students/number of students appeared in the examination)*

Successful students are those who are permitted to proceed to the final year

Academic Performance	**CAY**	**CAY*m*1**	**CAY*m*2**
Mean of CGPA or Mean Percentage of all successful students (X)	48/10 = 4.8	46/10 = 4.6	41/10 = 4.1
Total no. of successful students (Y)	55	51	43
Total no. of students appeared in the examination (Z)	62	68	55
API = x* (Y/Z)	4.258	3.45	3.2
Average API = (AP1 + AP2 + AP3)/3	**3.653**		

Academic Performance= 1.5*3.653 = 5.479

4.4 Academic Performance in Second Year (15)

*Academic Performance Level = 1.5 * Average API (Academic Performance Index)*

***API** = ((Mean of 2nd Year Grade Point Average of all successful Students on a 10 point scale) or (Mean of the percentage of marks of all successful students in Second Year/10)) x (number of successful students/number of students appeared in the examination)*

Successful students are those who are permitted to proceed to the Third year

Academic Performance	CAY	CAY*m*1	CAY*m*2
Mean of CGPA or Mean Percentage of all successful students (X)	51.8	54.2	53.7
Total no. of successful students (Y)	60	58	54
Total no. of students appeared in the examination (Z)	68	60	57
API = X* (Y/Z)	4.57	5.24	5.08
Average API = (AP1 + AP2 + AP3)/3	**4.963**		

Academic Performance Level = 1.5*4.963 = 7.445

4.5 Placement, Higher Studies and Entrepreneurship (40)

Assessment Points = 40 × average placement

Item	CAY	CAY*m*1	CAY*m*2
Total No. of Final Year Students (N)	59	57	55
No. of students placed in companies or Government Sector (x)	30	40	32
No. of students admitted to higher studies with valid qualifying scores (GATE or equivalent State or National Level Tests, GRE, GMAT etc.) (y)	04	02	03
No. of students turned entrepreneur in engineering/technology (z)	--------	---------	----------
x + y + z =	34	42	35
Placement Index : (x + y + z)/N	0.57	0.74	0.64
Average placement= (P1 + P2 + P3)/3	**0.65**		

Assessment Points = 40 * 0.65 = 26

4.6 Professional Activities: (20)

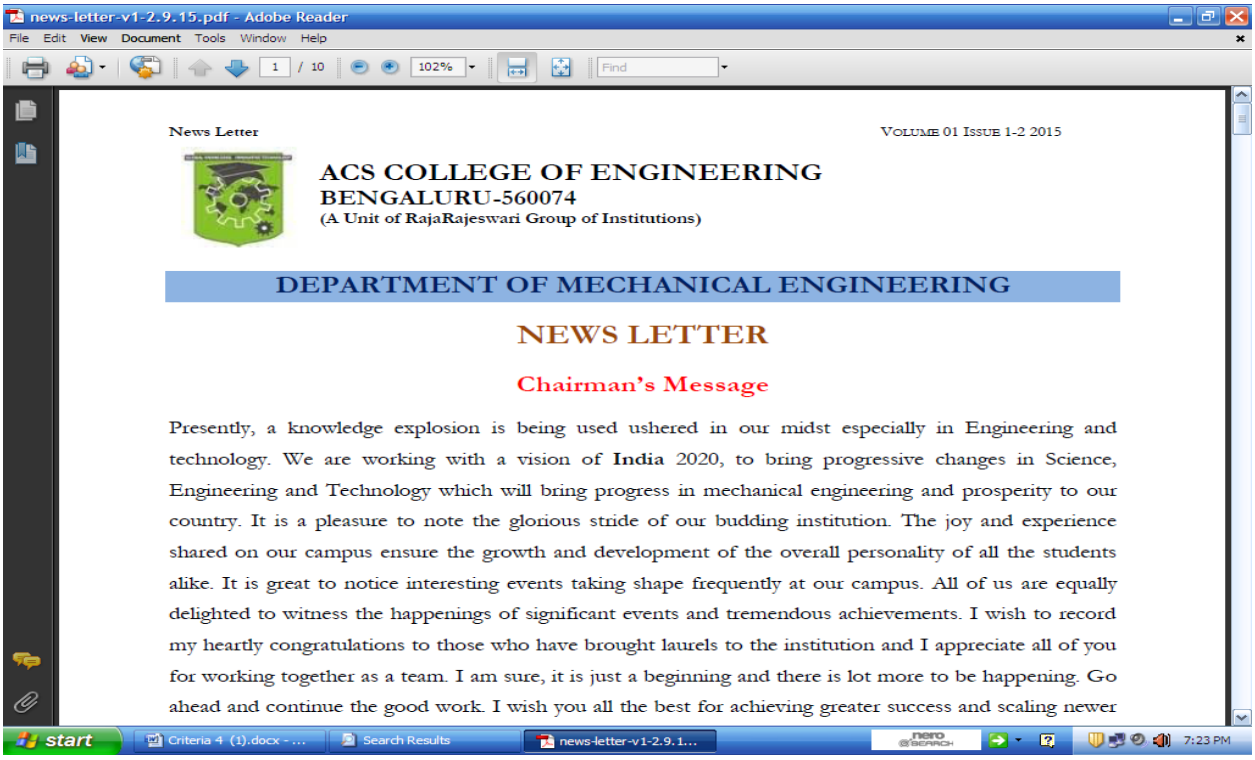
4.6.1 Professional Societies/ Chapters and organizing events (5)

Sl No	Professional Societies	Event
1	Solar society of India – Student Chapter	Guest Talk by T Kiran CEO Medidart, Bangalore.

Professional Societies Memberships

Sl No	Professional Societies	Member
1	Solar Society of India	Dr Eswarmoorthy
2	Indian Society of Technical Education	Dr Eswarmoorthy
3	Institute of Engineers India	Dr Eswarmoorthy
4	Institute of Engineers India	Dr Suresh P M
5	Indian Society of Technical Education	Prof Siddesh

4.6.2 Publication of technical magazines, newsletters (5)



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News Letter

VOLUME 01 ISSUE 1-2 2015

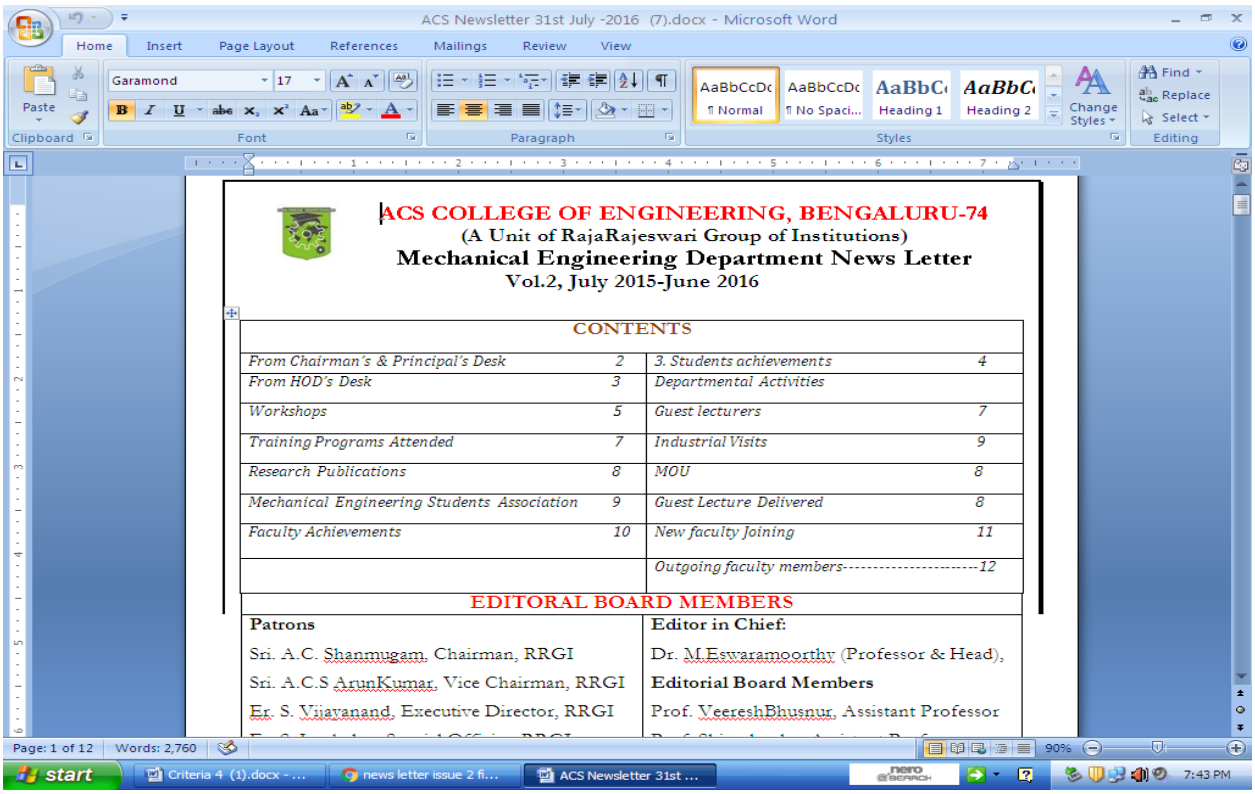
ACS COLLEGE OF ENGINEERING
BENGALURU-560074
(A Unit of RajaRajeswari Group of Institutions)

DEPARTMENT OF MECHANICAL ENGINEERING

NEWS LETTER

Chairman's Message

Presently, a knowledge explosion is being used ushered in our midst especially in Engineering and technology. We are working with a vision of **India** 2020, to bring progressive changes in Science, Engineering and Technology which will bring progress in mechanical engineering and prosperity to our country. It is a pleasure to note the glorious stride of our budding institution. The joy and experience shared on our campus ensure the growth and development of the overall personality of all the students alike. It is great to notice interesting events taking shape frequently at our campus. All of us are equally delighted to witness the happenings of significant events and tremendous achievements. I wish to record my heartly congratulations to those who have brought laurels to the institution and I appreciate all of you for working together as a team. I am sure, it is just a beginning and there is lot more to be happening. Go ahead and continue the good work. I wish you all the best for achieving greater success and scaling newer



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ACS COLLEGE OF ENGINEERING, BENGALURU-74
(A Unit of RajaRajeswari Group of Institutions)
Mechanical Engineering Department News Letter
Vol.2, July 2015-June 2016

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EDITORAL BOARD MEMBERS

4.6.3 Participation in inter institute events by students of the program of study (10)

Shamanth Kumar of VI Sem, Mechanical Engineering Secured First Place in CADD MODELLING at a National Level Technical Symposia, held at NIE, Mysore, on 10th and 11th April 2015.

Suhas.V of IV semester Mechanical Engineering participated in the State level Project Exhibition conducted at Dr. AIT, Bangalore.

Suhas. V and Tejesh Kumar of IV semester Mechanical Engineering secured Second place in Paper Presentation competition at a National Conference held at Jyothy Institute of Technology, Bangalore.

INTER COLLEGE ACHIEVEMENT LIST

Sl. No.	EVENT TITLE	COLLEGE	DATE	PRIZE
1	THEME BASED PAINTING	DON BOSCO INSTITUTE OF TECHNOLOGY, BENGALURU	29,30 APRIL, 2014	2ND PLACE CASH AWARD
2	CAD 3D MODELLING	CHRIST UNIVERRSITY,BENGALURU	20 FEBRUARY 2015	1ST PLACE CASH AAWARD
3	CAD 3D MODELLING	NATIONAL INSTITUTE OF ENGINEERING, MYSURU	10,11 APRIL 2015	1ST PLACE CASH AWARD
4	PENCIL SKETCHING (TECHNICAL)	NEW HORIZON COLLGE OF ENGINEERING, BNGALURU	23APRIL, 2015	1ST PLACE CASH AWARD
5	QUIZ COMPITETON	IISc, BENGALURU	23 SEPTEMBER 2015	PARTICIPATED
6	CAD 3D MODELLING	CHRIST UNIVERRSITY,BENGALURU	27 FEBRUARY 2015	2ST PLACE CASH AAWARD
7	INTERNATIONAL CONFERENCE	KONGU COLLEGE OF ENGINEERING, TAMILNADU	18,19 MARCH 2016	JOURNAL PUBLISHED – IJAER
8	MOTOROLA	M.S.RAMAIAH INSTITUTE OF	16 JUNE, 2016	PROJECT

	PROJECT AWARD	TECHNOLOGY		SPONSORSHIP AND APPRECIATION AWARD
9	PENCIL SKETCHING (TECHNICAL EVENT)	ACS COLLEGE OF ENGINEERING (AERONAUTICAL ENGINEERING)	14 OCTOBER, 2015	2ND PLACE CASH AWARD

CRITERIA-5	FACULTY INFORMATION AND CONTRIBUTION	200

List of Faculty Members -2016-2017

Name of the faculty member	Qualification			Designation & Date of Joining in the institution	Distribution of teaching load (%)				Academic Research			Sponsored Research (Funded Research)	Consultancy and Product Development	Specialization
					Ist year	UG		PG	Faculty receiving Ph.D During the assessment year	Ph.D Guidance	Research Publications			
	Degree Starting from highest	University	Year of Graduation			In program	Other program							
Dr. M ESWARA MOORTHY	Ph.D	NIT Trichy	2011	Professor 24.06.2014	-----	100%	------	-----	----	04	1	----	-----	Solar Thermal Engineering
	M.E	Pondichery University	2004											Energy Technology
	B.E	Bharathiyar University	1995											Mech
Dr.M S MURALI	Ph.D	Mysore University	2001	Professor 21.01.2016	100%	-------	------	-----	------	----	----	----	----	Mechanical Engineering
	M.E	Bangalore University	1992											Metal Casting Science & Engg
	B.E	Bangalore University	1985											Mech
Dr.SURESH P M	Ph.D	Kuvempu University	2010	Professor 01.07.2016	----	50%	-----	50%	-----	----	-----	----	----	Noise & Vibration
	M.Tech	Kuvempu University	1995											PEST

	B.E	Mysore University	1992											Mech
Dr.MOHAN RAJ	Ph.D	Anna University	2014	Professor 28.07.2016	-----	100%	-----	-----	----	-----	-----	-----	----	Mechanical Engg
	M.E	Anna University	2006											Production Engg
	M.B.A	IGNOU	2005											Marketing Management
	B.E	Bharathiar	1986											Mech
R.SIVASUBRAMANIYAM	Ph.D	VTU	2016	Associate professor 01.02.2014	------	100%	------	-----	----	----	----	----	-----	Thermal Power Engineering
	M.E	Annamalai university	2004											Thermal power
	B.E	Periyar university	2002											MECH
Dr .K V SHIVAPRASAD	Ph.D	NITK	2015	Associate professor 04.08.2016	----	100%	----	-----	----	----	----	----	----	Thermal Engineering
	M.Tech	NMAMIT Nitte	2009											Energy Systems Engineering
	B.E	MCE Hasan	2006											Mech
SIDDHESHA.H.S	Ph.D	Bangalore university	2016	Associate professor 01.08.2011	----	50%	----	50%	----	----	01	----	----	Composite materials
	M.Tech	KUVEMPU University	1996											PEST
	B.E	Mysore university	1992											MECH
BABU GOWDA	Ph.D	VTU	Pursuing	Assistant	50%	----	----	50%	----	----	----	----	----	PLM

C.M	M.Tech	VTU	2008	Professor 19.08.2013										PDM
	B.E	VTU	2006											Mech
KUMAR B.M	ME	Bengaluru university	2009	Assistant Professor 04/08/2011	50%	50%	------	-----	----	----	----	----	----	Thermal science & Engg
	BE	VTU	2004											MECH
SANDEEP.G.R	M.Tech	KUVEMPU University	2010	Assistant Professor 12/08/2011	-----	100%	------	-----	----	----	----	----	----	Machine Design
	B.E	VTU	2008											MECH
SUNIL RAJ.B.A	M.Tech	VTU	2010	Assistant Professor 23/07/2012	-----	100%	-----	------	----	----	----	----	-----	CIM
	B.E	VTU	2008											MECH
SRINIDHI AACHARYA.S	M.Tech	VTU	2012	Assistant Professor 01/08/2012	50%	50%	------	----	----	----	----	----	----	Machine Design
	B.E	VTU	2010											MECH
CHANDRASHEKHAR B	M.Tech	DAVANAGERE University	2012	Assistant Professor 26/07/2014	----	100%	------	----	----	----	----	---	----	Machine Design
	B.E	VTU	2010											I & P
CHANDRAKALA	M.Tech	VTU	2013	Assistant Professor 09/02/2015	----	100%	-----	----	----	----	----	----	----	PDM
	B.E	VTU	2011											I & P
SIVASANKAR.P	M.E	Anna university ,	2013	Assistant Professor 21/07/2015	100%	------	-----	----	----	----	----	---	----	Engineering Design
	B.E	Anna university	2011											MECH
JOGI ADHARSH	MS	Old dominion University	2009	Assistant Professor 01.02.2016	-----	100%	-----	----	----	----	----	----	----	CFD

	BE	Bangalore University	2001											MECH

CAY 2015-16

Name of the faculty member	Qualification			Designation & Date of Joining in the institution	Distribution of teaching load (%)				Academic Research			Sponsored Research (Funded Research)	Consultancy and Product Development	Specialization
					Ist year	UG		PG	Faculty receiving Ph.D During the assessment year	Ph.D Guidance	Research Publications			
	Degree Starting from highest	University	Year of Graduation			In program	Other program							
Dr. M ESWARA MOORTHY	Ph.D	NIT Trichy	2011	Professor 24.06.2014	-----	100%	-----	-----	----	04	3	2	-----	Solar Thermal Engineering
	M.Tech	Pondichery University	2004											Energy Technology
	B.E	Bharathiyar University	1995											Mech
DR.M.S..MURALI	Ph.D	Mysore University	2001	Professor 21.01.2016	100%	-------	------	-----	------	----	----	----	----	Mechanical Engineering
	M.E	Bangalore University	1992											Metal Casting Science & Engg
	B.E	Bangalore University	1985											Mech
SIDDHESHA.H.S	Ph.D	Bangalore university	2016	Associate professor	------	50%	------	50%	----	----	02	----	----	Composite materials

	M.Tech	KUVEMPU University	1996	01.08.2011										PEST
	B.E	Mysore university	1992											Mech
Dr.R.SIVASUBRAMANIYAM	Ph.D	VTU	2016	Associate professor 01.02.2014	------	100%	------	-----	YES	----	01	01	-----	Thermal Power Engineering
	M.Tech	Annamalai university	2004											Thermal power
	B.E	Periyar university	2002											Mech
BAPU GOWDA C.M	Ph.D	VTU	Pursuing	Assistant Professor 19.08.2013	-----	---	------	100%	----	----	----	----	----	PLM
	M.Tech	VTU	2008											PDM
	B.E	VTU	2006											Mech
KUMAR B.M	ME	Bengaluru university	2009	Assistant Professor 04/08/2011	50%	50%	------	-----	----	----	----	----	----	Thermal science & Engg
	BE	VTU	2004											Mech
SANDEEP.G.R	M.Tech	KUVEMPU University	2010	Assistant Professor 12/08/2011	-----	100%	------	-----	----	----	----	----	----	Machine Design
	B.E	VTU	2008											Mech
SUNIL RAJ.B.A	M.Tech	VTU	2010	Assistant Professor 23/07/2012	-----	100%	------	------	----	----	----	1	-----	CIM
	B.E	VTU	2008											Mech
SRINIDHI AACHARYA.S	M.Tech	VTU	2012	Assistant Professor 01/08/2012	50%	50%	-----	----	----	----	----	----	----	Machine Design
	B.E	VTU	2010											Mech
Ms. DEEPTHI	M.Tech	VTU	2011	Assistant Professor	---	100%	-----	----	----	----	----	----	----	Machine Design

	BE	VTU	2009	24/07/2014										I & P
VEERESH BHUSNUR	M.Tech	VTU	2013	Assistant Professor 23/07/2014	----	100%	-----	----	----	----	----	----	----	Mfg science & Engg
	B.E	VTU	2010											Mech
CHANDRASHEKHAR B	M.Tech	DAVANAGERE University	2012	Assistant Professor 26/07/2014	----	50%	-----	50%	----	----	----	1	----	Machine Design
	B.E	VTU	2010											I & P
CHANDRAKALA	M.Tech	VTU	2013	Assistant Professor 09/02/2015	----	100%	-----	----	----	----	----	1	----	PDM
	B.E	VTU	2011											I & P
SIVASANKAR.P	M.E	Anna university ,	2013	Assistant Professor 21/07/2015	----	100%	-----	----	----	----	----	1	----	Engineering Design
	B.E	Anna university	2011											Mech
JOGI ADHARSH	MS	Old dominion University	2009	Assistant Professor 01.02.2016	100%	-----	------	----	----	----	----	----	----	CFD
	BE	Bangalore University	2001											Mech
BABU.A	M.E	Anna University	2013	Assistant Professor 02/02/2015	100%	-----	-----	---	------	------	------	------	------	CAD/CAM
	B.E	Anna University	2011											Mech
ARAVIND .V	M.Tech	Anna University	2012	Assistant Professor 02/02/2015	100%	------	-----	------	------	------	----	-----	-------	CAD/CAM
	B.E	Anna University	2010											Mech
NAGANNA.P	M.Tech	VTU	2012	Assistant	100%	------	-----	------	------	------	----	-----	-------	Machine

				Professor 02/02/2015										Design
	B.E	VTU	2010											Mech

ACADEMIC YEAR 2014-2015

Name of the faculty member	Qualification			Designation & Date of Joining in the institution	Distribution of teaching load (%)				Academic Research			Sponsored Research (Funded Research	Consultancy and Product Development	Specialization
					Ist year	UG		PG	Faculty receiving Ph.D During the assessment year	Ph.D Guidance	Research Publications			
	Degree Starting from highest	University	Year of Graduation			In program	Other program							
Dr.M ESHWARA MOORTHY	Ph.D	NIT Trichy	2011	Professor 24.06.2014	-----	100%	----	-----	----	03	02	3	-----	Solar Thermal Engineering
	M.Tech	Pondichery University	2004											Energy Technology
	B.E	Bharathiyar University	1995											Mech
Dr.RAJU B R	Ph.D	Kuvempu University	2014	Professor 01/08/2013	----	----	----	100%	YES	----	04	01	01	Composite materials
	M.Tech	Kuvempu University	1995											PEST
	BE	Mysore University.	1990											Mech
SIDDHESHA.H.S	Ph.D	Bangalore university	2016	Associate professor	----	100%	-----	-----	----	----	03	1	----	Composite materials

	M.Tech	Kuvempu University	1996	01.08.2011										PEST
	B.E	Mysore university	1992											Mech
C.RAMESH	Ph.D	Sathya Bhama university	2017	Associate professor 21.08.2010	------	100%	-----	------	----	----	02	----	----	Composite Materials
	M.Tech	Sathya Bhama university	2005											ME-CAD
	B.E	Madras university	2003											Mech
R.SIVASUBRAMANIYAM	Ph.D	VTU	Pursuing	Associate professor 01.02.2014	------	100%	-----	-----	----	----	----	01	-----	Thermal Science
	M.Tech	Annamalai university	2004											Thermal power
	B.E	Periyar university	2002											Mech
Dr.GIRISHA C	Ph.D	VTU	2015	Associate professor 29.07.2013	----	100%	-----	100%	YES	----	----	----	----	Mechanical Engineering
	M.Tech	VTU	2002											Material Science and Engineering
	B.E	VTU	1998											Mech
VIJAY KUMAR S TOTAD	Ph.D	VTU	Pursuing	Associate professor 18.07.2011	100%	----	------	-----	--------	-------	------	-----	--------	
	M.Tech	VTU	2004											Thermal Power
	B.E	Karnataka University	1991											Mech
BABU GOWDA C.M	Ph.D	VTU	Pursuing	Assistant Professor	-----	------	-----	100%	----	----	----	----	----	PLM
	M.Tech	VTU	2008											PDM

	B.E	VTU	2006	19.08.2013										Mech
KUMAR B.M	ME	Bengaluru university	2009	Assistant Professor 04/08/2011	------	100%	----	-----	----	----	----	----	----	Thermal science & Engineering
	BE	VTU	2004											Mech
SANDEEP.G.R	M.Tech	Kuvempu university	2010	Assistant Professor	-----	100%	-----	-----	----	----	----	----	----	Machine Design
	B.E	VTU	2008	12/08/2011										Mech
SUNIL RAJ.B.A	M.Tech	VTU	2010	Assistant Professor 23/07/2012	-----	100%	-----	------	----	----	02	----	-----	CIM
	B.E	VTU	2008											Mech
SRINIDHI AACHARYA.S	M.Tech	VTU	2012	Assistant Professor 01/08/2012	-----	100%	------	----	----	----	----	----	----	Machine Design
	B.E	VTU	2010											Mech
Ms. DEEPTHI	M.Tech	VTU	2011	Assistant Professor 24/07/2014	---	100%	-----	----	----	----	----	----	----	Machine Design
	BE	VTU	2009											I & P
VEERESH BHUSNUR	M.Tech	VTU	2013	Assistant Professor 23/07/2014	----	100%	------	----	----	----	----	----	----	Manufacturing science & Engineering
	B.E	VTU	2010											Mech
CHANDRASHEKHAR B	M.Tech	DAVANAGERE University	2012	Assistant Professor 26/07/2014	----	100%	------	----	----	----	----	----	----	Machine Design
	B.E	VTU	2010											I & P
RAJKUMAR D	MTech	Anna University	2010	Assistant Professor	---	100%	-----	----	----	----	----	----	----	Mft Technology

	BE	Bharathi Dhasan	2002	02/02/2015										Mech
BABU.A	M.E	Anna University	2013	Assistant Professor 02/02/2015	100%	-----	-----	---	------	------	------	------	------	CAD/CAM
	B.E	Anna University	2011											Mech
ARAVIND .V	M.Tech	Anna University	2012	Assistant Professor 02/02/2015	100%	------	-----	------	------	------	----	-----	-------	CAD/CAM
	B.E	Anna University	2010											Mech
NAGANNA.P	M.Tech	VTU	2012	Assistant Professor 02/02/2015	100%	------	-----	------	------	------	----	-----	-------	Machine Design
	B.E	VTU	2010											Mech

ACADEMIC YEAR 2013-2014

Name of the faculty member	Qualification			Designation & Date of Joining in the institution	Distribution of teaching load (%)				Academic Research			Sponsored Research (Funded Research	Consultancy and Product Development	Specialization
	Degree Starting from highest	University	Year of Graduation		Ist year	UG		PG	Faculty receiving Ph.D During the assessment year	Ph.D Guidance	Research Publications			
						In program	Other program-m							
Dr. SATISH K	Ph.D	Bengaluru University	2009	Professor 02.01.2013	---	100%	-----	-----	-------	------	----	-----	---	Aeroelasticity
	ME	IIT, Madras	1978											Fine Technolo

														gy
	BE	IIT, Madras	1973											Mech
SIDDHESHA.H.S	Ph.D	Bangalore university	2016	Associate professor 01.08.2011	----	100%	-----	-----	----	----	05	1	----	Composite materials
	M.Tech	KUVEMPU University	1996											PEST
	B.E	Mysore university	1992											Mech
VIJAYAKUMAR TOTAD	PhD	VTU	Pursuing	Associate professor 18.07.2011	100%	----	-----	-----	----	----	----	----	----	
	M.Tech	VTU	2004											Thermal Power
	BE	Karnataka University	1991											Mech
C.RAMESH	Ph.D	Sathya Bhama university	2017	Associate professor 21.08.2010	------	100%	-----	------	----	----	02	----	----	Composite Materials
	M.Tech	Sathya Bhama university	2005											ME-CAD
	B.E	Madras university	2003											Mech
R.SIVASUBRAMANIYAM	Ph.D	VTU	Pursuing	Associate professor 01.02.2014	------	100%	-----	-----	----	----	02	01	-----	Thermal Science
	M.Tech	Annamalai university	2004											Thermal power
	B.E	Periyar university	2002											Mech
GIRISHA C	Ph.D	VTU	2015	Associate professor 29.07.2013	---	100%	-----	----	----	----	----	----	----	Mech
	M.Tech	VTU	2002											Material Science and Engg

	B.E	VTU	1998											Mech
BABU GOWDA C.M	Ph.D	VTU	Pursuing	Assistant Professor 19.08.2013	-----	100%	-----	-----	----	----	----	----	----	PLM
	M.Tech	VTU	2008											PDM
	B.E	VTU	2006											Mech
KUMAR B.M	ME	Bengaluru university	2009	Assistant Professor 04/08/2011	-----	100%	-----	-----	----	----	----	----	----	Thermal science & Engg
	BE	VTU	2004											Mech
SANDEEP.G.R	M.Tech	KUVEMPU University	2010	Assistant Professor 12/08/2011	-----	100%	-----	-----	----	----	----	----	----	Machine Design
	B.E	VTU	2008											Mech
SUNIL RAJ.B.A	M.Tech	VTU	2010	Assistant Professor 23/07/2012	-----	100%	-----	------	----	----	02	1	----	CIM
	B.E	VTU	2008											Mech
SRINIDHI AACHARYA.S	M.Tech	VTU	2012	Assistant Professor 01/08/2012	-----	100%	-----	----	----	----	----	----	----	Machine Design
	B.E	VTU	2010											Mech
VENKATARAJESH CS	M.Tech	VTU	2005	Assistant Professor 01.02.2014	-----	100%	------	----	----	----	----	----	----	Maintenance Engg
	BE	Kuvempu University	1999											Mech
DIVAKAR SHETTY A.S	P.hD	VTU		Assistant Professor 01.02.2014	-----	100%	-------	----	----	----	----	----	----	
	M.Tech	VTU	2009											Energy System Engg
	BE	VTU	2005											Mech

MOHAN KUMAR O	M.Tech	NITK	2013	Assistant Professor 01.02.2014	100%	------	-----	---	----	----	----	----	----	Mechatronics Engg
	BE	Kuvempu University	2003											Mech

5.1.STUDENT-FACULTY RATIO (SFR)

S: F ratio =N/F: N = No. of Students = 3X Where X is (Approved intake + 20% lateral entry intake + separate division, if any)
F= No. of faculty = (a + b - c) for every assessment year.
a: Total number of full time regular Faculty serving fully to 2^{nd},3^{rd} ,4^{th} year of the this program.
b: Total number of full time equivalent regular faculty (considering fractional load) serving this program from other program(s).
c: Total number of full time equivalent regular faculty (considering fractional load) of this program serving other program(s).

Year	**X**	**N**	**F**	**SFR= N/F**
2016-2017	3x72	216	12	18
CAY(2015-2016)	3x72	216	12	18
CAYm1(2014-2015)	3x72	216	12	18
CAYm2(2013-2014)	3x72	216	12	18
Average SFR for three assessment years				18

5.2. FACULTY CADRE PROPORTION

The Reference Faculty Cadre Proportion is 1(F1) : 2(F2) : 6(F3)
F1 : Number of professors required = 1/9 x Number of faculty required to comply with 15 : 1 Student – Faculty Ratio Based on no. of students(N) as per 5.1
F2 : Number of Associate professors required = 2/9 x Number of faculty required to comply with 15 : 1 Student – Faculty Ratio Based on no. of students(N) as per 5.1
F3 : Number of Assistant professors required = 6/9 x Number of faculty required to comply with 15 : 1 Student – Faculty Ratio Based on no. of students(N) as per 5.1
Note: If AF1 =AF2 =0 Then Zero Mark

Year	Professors		Associate professor		Assistant professor	
	Required F1	Available F1	Required F2	Available F2	Required F3	Available F3
CAY(2015-2016)	1	1	3	2	8	9
CAYm1(2014-2015)	1	1	3	3	8	8
CAYm2(2013-2014)	1	1	3	3	8	8
Average Numbers	RF1 =1	AF1 =1	RF2 =3	AF2 =2.67	RF3 =8	AF3 =8.3

Cadre Ratio Marks = {(1/1) + [(2.67/3) x 0.6] + [(8.3/8) x 0.4]} x 12.5

=24.2

5.3 FACULTY QUALIFICATION

FQ=2.5 x [{(10X + 6Y)/F}] Where X is no. of regular faculty with Ph.D., Y is no. of Regular faculty with M.Tech. F is no. of regular faculty required to comply 1:15 Student ratio.

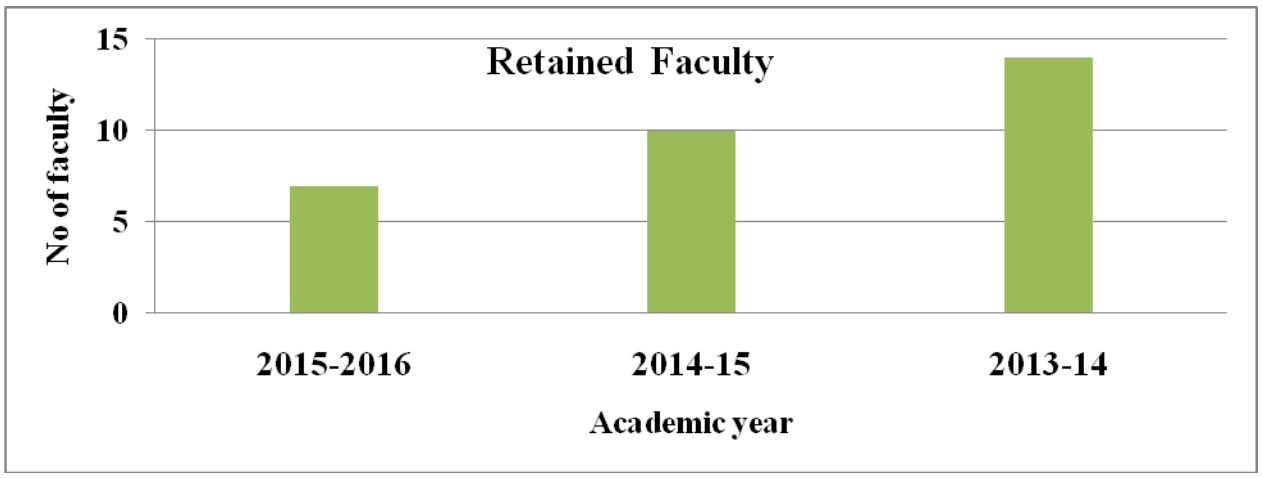
Year	X	Y	F	FQ=2.5x[{(10x + 6y)/F}]
CAY(2015-2016)	2	10	12	16.66
CAYm1(2014-2015)	1	11	12	15.83
CAYm2(2013-2014)	1	11	12	15.83
			Average assessment	16.10

=2.5 x [{(10*2) + (6*10)/12}]
= 16.6

5.4. FACULTY RETENTION

Item	CAY	CAYm1	CAYm2
>=90% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year			**14**
>=75% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year			
>=60% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year		**10**	
>=50% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year	**07**		
<50% of required Faculty Retained During the Period of assessment Keeping CAYm2 as base Year			

Year	Retained Faculty's	%
CAY 2015-16	07	58.33
CAYm1 2014-15	10	71.4
CAY m2 2013-14	14	100



5.5. INNOVATIONS BY THE FACULTY IN TEACHING AND LEARNING

- Faculty using with physical models and 3D models at the time of teaching -Drawing class

- Smart Class room facilities

- Using animation By All type of mechanism- Design Class

- Finite element analysis of Bar Beam truss and plate Heat transfer and Vibration problems Validation done by Using ANSYS.
- Final year projects, guided by the faculties by using statistical software's and simulation software.

5.6. FACULTY AS PARTICIPANTS IN FACULTY DEVELOPMENT / TRAINING ACTIVITES / STTPs

- A Faculty scores maximum five points for participation
- Participation on 2 to 5 days Faculty development program: 3 points
- Participation > 5 days faculty development program: 5points

Name of the Faculty	Max. 5 per faculty		
	CAY	CAYm1	CAYm2
Dr. Eshwara moorthy	5	5	---
Mr. Siddhesha.H.S	5	5	5
Dr. R.Sivasubramaniyam	5	3	3
Mr. Babu Gowda C.M	5	5	5
Mr. Kumar B.M	5	5	3
Mr. Sandeep.G.R	5	3	3
Mr. Sunil Raj.B.A	5	3	3
Mr. Srinidhi Aacharya.S	5	3	3
Mr.Jogi adharsh	3	---	---
Mr. Chandrashekhar B	5	5	---
Ms. Chandrakala K	3	---	---
Mr. Sivasankar.P	3	----	---
Sum	54	37	25
RF=Number of faculty required to comply with 15:1 Student-faculty ratio as per 5.1	12	12	12
Assessment = 3x(Sum/ 0.5RF)	27	18.5	12.5
Average assessment over three years	19.33		

5.7. Research and Development

- 5.7.1. Academic Research
- Number of Quality Publications in Refereed/SCI journals, Citations, Books/Book Chapters
- Ph.D. Guided /Ph.D. Awarded During The Assessment period While Working in the Institute

Sl.No	Guide Name	Research Scholar

1	Dr. M Eswaramoorthy	• KM Gurmurthy
		• Sunilraj BA
		• Sandeep K
		• Raju KK
		• Prabahkar M
		• SenthilPrasad M
		• Rajasekar G
2	Dr. R.Sivasubramaniam	• Girish A (awaiting for V-RAT)

Dr. R.Sivasubramaniam, awarded Ph.D degree in the academic year2015-2016 under VTU, Belgaum.

Dr. Raju B R awarded Ph.D degree in the academic year 2014-2015 under Kuvempu University.

Dr. Girisha C awarded Ph.D degree in the academic year 2014-2015 under VTU, Belgaum.

Sl no.	*Name of the Teacher*	*Title of the Paper*	*Publication Citation*	*Date/Year of Publication*	*National / International Journal*
1	**Dr.M.Eswaramoorthy**	"Modeling and analysis of solar parabolic dish thermoelectric generator"	Energy Sources Part A : Recovery, Utilization and Environmental Effects 34(14), pp: 1531-1539.	2014	International Journal
		'Experimental study on solar parabolic dish thermoelectric generator'	International Journal of Energy Engineering Volume 3, No. 3, pp.62-69	2013	International Journal
		'Experimental evaluation of energy and exergy efficiency of solar parabolic dish thermoelectric power generator'	Energy Sources Part A : Recovery, Utilization and Environmental Effects 36(17), pp: 1865-1870	2014	International Journal
		"Experimental investigation of solar still coupled with evacuated tube collector "	Energy Sources Part A : Recovery, Utilization and Environmental Effects Volume 35, Issue 15, pp. 1441-1455	2013	International Journal
		Performance Evaluation on Solar Still Integrated with Nano-Composite Phase Change Materials,	Applied Solar Energy	2015	International Journal
		Exergy Analysis of Solar Still Integrated Nano Composite Phase Change Materials.	Applied Solar Energy	2015	International Journal

2	**H S Siddesha**	"Study of Cyclic Constrained Groove Pressing Factors on Hardness Behavior of Al/Sic – MMC Subjected to Severe Plastic Deformation"	International organization of scientific research journal (IOSRJ), [E-ISSN:2250-3021]	July-2013 Vol: 3, Issue-7. Pages: 27-35.	International Journal
		Effect of severe plastic deformation on mechanical properties of al6061 / SiC metal matrix composites	IJRET, eISSN: 2319-1163 | pISSN: 2321-7308TIAMTE-2015	V-4, Special Issue-08,Pages-22-24,2015	International Journal
		"Characterization of Mechanical Properties of Aluminum Processed by Repetitive Corrugation and Straightening Process using Taguchi Analysis".	Journal of Materials [DOI: 10.1007/s11837-012-0503-1]	February-2013, Volume:65, Issue-2. Pages: 294-298	International Journal
		"Investigation of microstructure and mechanical properties of commercially pure aluminum produced by RCS process".	International Journal of Engineering Research and Applications (IJERA), [ISSN: 2248-9622]	September-October 2012 Vol:2, Issue-5. Pages: 333-341	International Journal
		"Taguchi analysis of repetitive corrugation and straightening factors on grain size, tensile and hardness behavior of al subjected to severe plastic deformation".	International Journal of Advanced Engineering Technology(IJAET), [E-ISSN 0976-3945]	January-March,2012. Vol:3	International Journal
		"Case Hardening Effect on Mechanical properties in Graphite Reinforced Al6061 MMCs".	International Journal of Applied Research in Mechanical Engineering (IJARME)	Jan:2011 Vol:1	International Journal
		"Thermal stability of ultrafine grained Al6061 alloy processed through cyclic constrained groove pressing"	Advanced Engineering and Applied Sciences: An International Journal: Universal research publications.	Jan:2014: 4(1) Pages:1-6	International Journal
		"Optimization of Cyclic Constrained	Procedia Materials Science	March - 2014	International

		Groove Pressing parameters for Tensile Properties of AL6061 / SiC Metal Matrix composites"	[Elsvier]		Journal
		Experimental and computational simulation of producing Ultra-Fine Grain Structure processed by CGP	nternational Journal of Advance Research in Science and Engineering.	V-4,Issue-2 Pages-580-591,2015/2	International Journal/International Conference
3	**Ramesh.C**	"An overview of magnetism of spinel nano-ferrite particles and A study of chromium substituted Zn-Mn ferrites nanostructures via sol-gel method"	Nano Science Engineering and Technology. Print ISBN: 978-1-4673-0071-1 [Published in IEEE Explorer]	Nov-2011 Pages: 119-124	Print ISBN: 978-1-4673-0071-1 [Published in IEEE Explorer]
4	**Dr. B.R.Raju**	"Triboperformance of Silicon Dioxide Filled Glass Fabric Reinforced Epoxy Composites"	ARPN Journal of Engineering and Applied Sciences,	2012, Vol. 7, No. 4, Pages. 485-491.	International Journal
		"Experimental Study on Drilling of Particulate Filled Glass-Epoxy Composites Manufactured by Hand Lay-Up Technique."	International Journal of Materials Science,	2012, Vol. 7, No. 2, Pages. 93-104.	International Journal
		"The Effect of Silicon-Dioxide Filler on the Wear Resistance of Glass Fabric Reinforced Epoxy Composites"	International Journal of Advances in Polymer Science and Technology,	2012, Vol. 2, No. 4, Pages. 51-57.	International Journal
		"Assessment of Cutting Parameters Influencing on Thrust Force and Torque during Drilling Particulate Filled Glass Epoxy Composites"	Journal of Minerals and Materials Characterization and Engineering,	2013, Vol. 1, No. 3, Pages. 101-109.	International Journal
		"Investigations on Mechanical and TribologicalBehaviour of Particulate Filled Glass Fabric Epoxy Composites"	Journal of Minerals and Materials Characterization and Engineering,	2013, Vol. 1, No. 4, Pages.160-167	International Journal

		"Three-Body Abrasive Wear Behaviour of Silicon Carbide Filled Glass-Fabric Reinforced Epoxy Composites Using Taguchi Method"	International Journal of Advances in Polymer Science and Technology,	2013, Vol:3 Pages:36-41	International Journal
5	**Girisha.C**	"Tensile Properties Of Natural Fiber-Reinforced Epoxy-Hybrid Composites"	International Journal of Modern Engineering Research [ISSN: 2249-6645]	Mar-Apr 2012, Vol.2, Issue.2, Pages-471-474	International Journal
		"Effect Of Alkali Treatment, Fiber Loading And Hybridization On Tensile Properties Of Sisal Fiber, Banana Empty Fruit Bunch Fiber And Bamboo Fiber Reinforced Thermoset Composites"	International Journal Of Engineering Science & Advanced Technology [ISSN: 2250–3676.]	Volume-2, Issue-3, May-June : 2012, Pages:706 – 711	International Journal
		"Sisal/Coconut Coir Natural Fibers – Epoxy Composites: Water Absorption And Mechanical Properties"	International Journal of Engineering and Innovative Technology [ISSN: 2277-3754] ISO 9001:2008 Certified	Volume 2, Issue 3, September 2012 Pages:166-170	International Journal
		"Mechanical Performance Of Natural Fiber-Reinforced Epoxy-Hybrid Composites"	International Journal of Engineering Research and Applications [ISSN: 2248-9622]	Vol. 2, Issue 5, September-October 2012, Pages.615-619	International Journal
6	**Dr. R.SivaSubramaniyam**	Performance Analysis on Array of Circular Fins through Forced Convection	International Journal of Engineering Research and Technology. [ISSN 0974-3154]	Number 2014, Volume 7, Pages: 1-8	International Journal
		Performance Analysis and Heat Transfer Studies on Protruding Surfaces of Electronic Components	International Journal of Engineering Research and Technology. [ISSN 0974-3154]	Number 2014, Volume 7, Pages: 9-19	International Journal

		Performance analysis and heat transfer studies on protruding surfaces of electronic components	International Journal of Engineering Studies [Accepted for Publication]	2014	International Journal
		Performance of Alumina Coatings Prepared by Hard Anodizing, Micro Arc Oxidation and Detonation Spray Processes on Al-Mg- Si Alloy under Fretting Wear Loading	Part J:Journal of Engineering Tribology, 228 pp 454–462	2014	International Journal
		Influence of Laser Peening on microstructure and Fatigue Lives of Ti-6Al- 4V	TNMS China, 24, (2014), pp 3111–3117	2014	International Journal
7	**Kumar.B.M**	"Design and Analysis of a Hydrostatic thrust pad using CFD approach	International Journal on Mechanical and Automobile Engineering, Summer Edition [ISSN: 0974-231]	March-2009 Vol: 3, No. 4	International Journal
		"Design and Analysis of an Automobile brake drum by using ANSYS"	International Journal on Mechanical and Automobile Engineering, , Summer Edition [ISSN: 0974-231]	March-2009 Vol: 3, No. 4	International Journal
8	**Sunil Raj B.A.**	'Rejection Analysis of Rail Axel using Juran's Quality improvement project by project approach in RWF: Case Study.	Journal of Engineering Today. [ISSN:0974-8377]	Nov-2013 Issue:11	National Journal
		Quality Improvement of Axels by using control Charts: A Case Study.	Journal of Engineering Today. [ISSN:0974-8377]	Nov-2013 Issue:11	National Journal
9	**VijayaKumar.S.Totad**	Numerical Simulation of Two – Dimensional Incompressible Viscous flow over aerofoil blade	International Journal on Mechanical Enginering and Robotics(IJMER), V-2, Issue-6, Pp: 75-77	2015	International Conference/ Journal
10	**Chandrashekhar B**	Analysis of creep life Prediction for gas Turbine disc	International Journal of Research in Advent Technology Volume.2, Issue.06. [E-ISSN:2321-9637]	2014	International Journal

11	**Chandrakala k**	Design and development of Special purpose joy stick for Two wheelers	International Journal of Engineering Research & Technology in IJERT,Volume.3, Issue.05	2014	International Journal

- 5.7.2. Sponsored Research

Note; Funded Research

- Amount > 20 Lakhs-5 Marks
- Amount > =16 Lakhs and < =20 Lakhs -4 Marks
- Amount > =12 Lakhs and <16 Lakhs -3 Marks
- Amount > =8 Lakhs and <12 Lakhs -2 Marks
- Amount >= 4 Lakhs and < 8 Lakhs -1 Mark
- Amount<4 Lakhs -0 Mark

Grants Received from Sponsoring Agency				
Academic Year	**SPP approved by KSCST**			
	S.No	**Title of the Project**	**Principal Investigator**	**Amount (INR)**
2013-14	1	Experimental and computational simulation of producing Ultra-fine grained Aluminum silicon carbide composites processed by constrained groove pressing	Mr.H.S.Siddesha	4500/-
	2	Automatic Speed control and detection of gas leakage of vehicle using Eye Blink Sensor and Gas sensor		4500/
	3	Mechanical properties evaluation of Natural fibers reinforced Bio-Composites and fabrication of a Telephone stand.	Mr Girisha.C	4500/
	4	Mechanical and Thermal properties of Nano-Clay dispersed biodegradable polymer Nano-composites for the packaging applications.		4000/
2014-15	**SPP approved by KSCST**			
	5	Experimental and computational simulation of producing ultrafine grain Size in aluminum sheet by severe plastic deformation	Prof. H.S.Siddesha	6000/-
	6	Investigations on the influence of micro fillers on three-body abrasive	Dr.Raju.B.R	6000/-

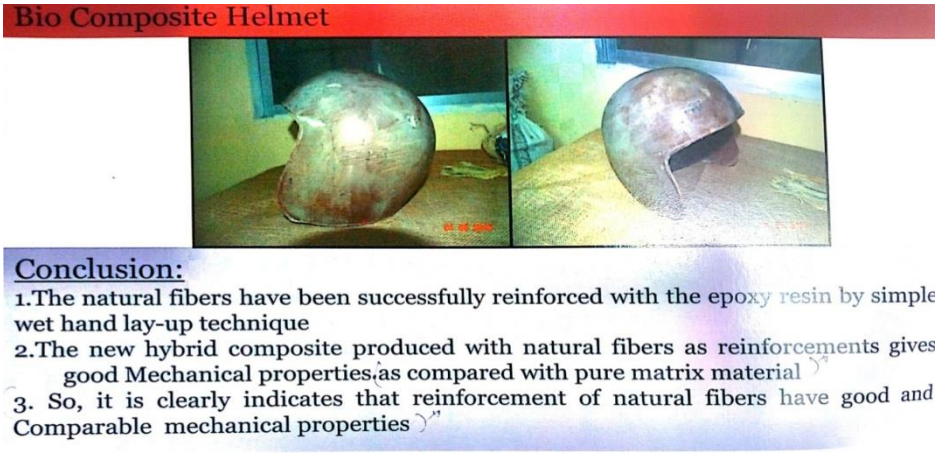
		wear behavior of glass fabire reinforced epoxy composites.		
	7	Biogas production from paper waste with blend with cow Dung	Prof.Sivasubramaniam	5000/-
	8	Bio-Composites Bumper for automobile	Prof. Girisha.C	5000/-
	VGST (TRIP)			
	9	Design, development and experimental evaluation of V-Trough solar air heater with thermal energy storage for drying applications	Dr.M.Eswaramoorthy	30,000/-
	VGST (SMSYR)			
	10	Experimental evaluation of Solar photovoltaic-thermoelectric with latent heat effect	Dr.M.Eswaramoorthy	400,000/-
	VGST-VTU (FDP)			
	11	"Sustainable Product Design and Manufacturing".	Dr.Raju.B.R	2,00,000/-
	IE(I)			
	12		Dr.M.Eswaramoorthy	20,000/-
2015-16	**SPP approved by KSCST**			
	13	Design, Development and Experimental Evaluation of Hybrid Fresnel Using Lens Solar Stove	Prof.Chandrakala&Dr. M.Eswaramoorthy	5,000/-
	14	Solar Powered Thermoelectric Refrigeration System	Prof.Sivasubramaniam Prof. P.Shivashankar	5000/-
	15	Bio-Design And Fabrication Of Bio-composite Helmet	Prof.Sunilraj.B.A Prof.Chandrashekhar B	4500/-
	SPP approved by FAER MOTROLA SCHALOAR AWARD			
	16	Experimental Study on Solar Parabolic Dish Cooker with Nanomaterial Blend Thermal Energy Storage	Dr.M.Eswaramoorthy	1985/-
	MNRE (GOVERNMENT OF INDIA)			
	17	Ministry of New and Renewable Energy (MNRE), Government of India (GoI) Sponsored Two Days National Workshop on Challenges and Opportunities on Renewable Energy Conversion Technologies	Dr.M.Eswaramoorthy Prof. Siddesha. H.S Prof. Kumar BM	52,000/-
	DST-NIMAT (EAC)			
	18	Entrepreneurship Awareness Camp	Dr.M.Eswaramoorthy & Prof .Sunil raj .B.A	20,000/-
	DST-NIMAT(FDP)			

	19	Faculty development program on Entrepreneurship	Dr.M.Eswaramoorthy & Prof .Sunil raj .B.A	2,50,000/-
			Total	**10,27,985/-**

➢ **5.7.3. Development activities**

- PRODUCT DEVELOPMENT ;

1. With the faculty guidance our final year students done his projects on bio degradable Helmet using bio composite materials



2. Vision Group on Science and Technology, Government of Karnataka Sponsored (TRIP Scheme) V-Trough Solar Air Heater with Thermal Storage for Drying Applications. Thanks to VGST for financial support for the academic year 2014-15 Student Team Member: Mr Bharathesh and Mr. Gokul Ram. Grant: Rs.30000/- Guide: Dr.M.Eswaramoorthy , Test Bed: Play Field @ ACS College of Engineering, Bengaluru

Source: http://www.acsce.edu.in/acsce/wp-content/uploads/2015/05/VGST-SPONSORED-TRIP-RESEARCH-PROJECT-2014-15-1.pdf

- RESEARCH LABORATORIES;
  - Material Testing Laboratory
  - Energy conversion Lab(IC Engines)
  - Heat and Mass Transfer Lab

- CAMA LAB

- INSTRUCTIONAL MATERIALS;
  - Lab Manuals
  - Suppliers Manual
  - NPTEL lecture notes
- WORKING MODELS/CHARTS/MONOGRAMS;
  - IC Engine Cut section (2-s & 4-s)
  - CAED Models

5.7.4. Consultancy (From Industry)

Grants Received from Sponsoring Agency				
Academic Year	**SPP approved by KSCST**			
	Sl. No	Title of the Project	Principal Investigator	Amount (INR)
2013-14	1	Experimental and computational simulation of producing Ultra-fine grained Aluminium silicon carbide composites processed by constrained groove pressing	Mr.H.S.Siddesha	4500/-
	2	Automatic Speed control and detection of gas leakage of vehicle using Eye Blink Sensor and Gas sensor		4500/
	3	Mechanical properties evaluation of Natural fibers reinforced Bio-Composites and fabrication of a Telephone stand.	Mr Girisha.C	4500/
	4	Mechanical and Thermal properties of Nano-Clay dispersed biodegradable polymer Nano-composites for the packaging applications.		4000/
2014-15	**SPP approved by KSCST**			
	5	Experimental and computational simulation of producing ultrafine grain Size in aluminum sheet by severe plastic deformation	Prof. H.S.Siddesha	6000/-
	6	Investigations on the influence of micro fillers on three-body abrasive wear behavior of glass fabire reinforced epoxy composites.	Dr.Raju.B.R	6000/-
	7	Biogas production from paper waste with blend with cow Dung	Prof.Sivasubramaniam	5000/-
	8	Bio-Composites Bumper for automobile	Prof. Girisha.C	5000/-
	VGST (TRIP)			
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	VGST (SMSYR)			
	10	experimental evaluation of Solar photovoltaic-thermoelectric with latent heat effect	Dr.M.Eswaramoorthy	400,000/-
	VGST-VTU (FDP)			
	11	“Sustainable Product Design and Manufacturing”.	Dr.Raju.B.R	2,00,000/-

	IE(I)			
	12		Dr.M.Eswaramoorthy	20,000/-
2015-16	**SPP approved by KSCST**			
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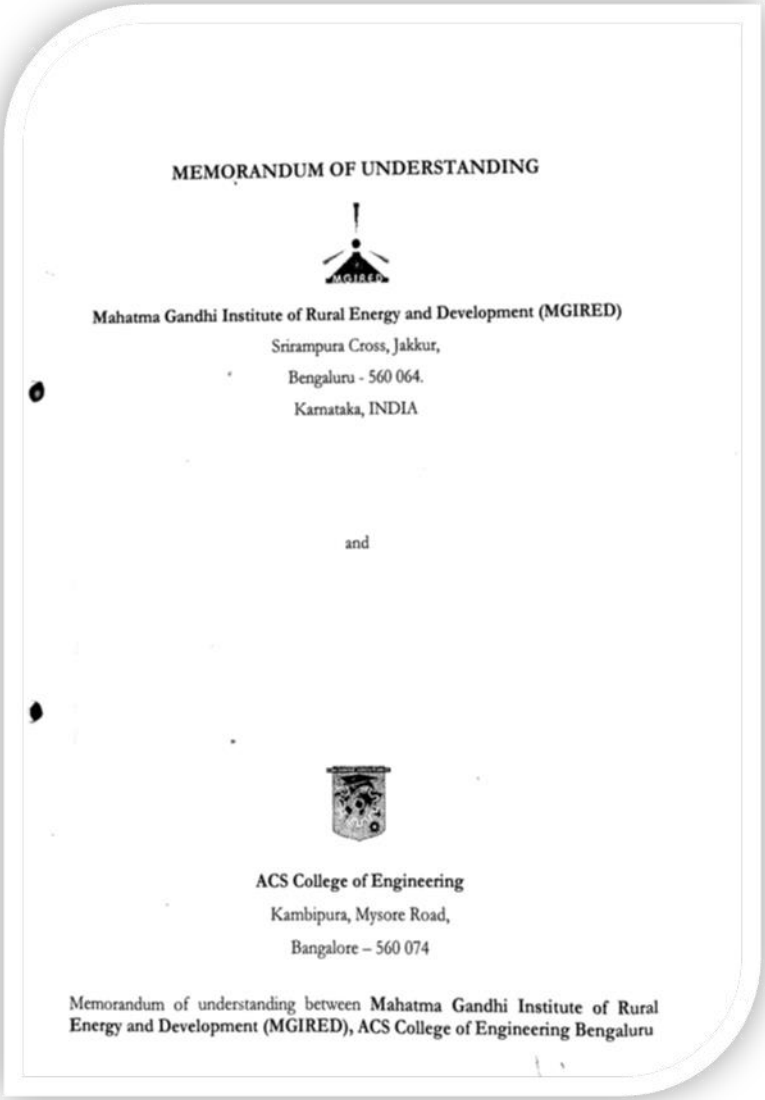
	15	Bio-Design And Fabrication Of Bio-composite Helmet	Prof.Sunilraj.B.A Prof.Chandrashekhar B	4500/-
	SPP approved by FAER MOTROLA SCHALOAR AWARD			
	16	Experimental Study on Solar Parabolic Dish Cooker with Nanomaterial Blend Thermal Energy Storage	Dr.M.Eswaramoorthy	1985/-
	MNRE (GOVERNMENT OF INDIA)			
	17	Ministry of New and Renewable Energy (MNRE), Government of India (GoI) Sponsored Two Days National Workshop on Challenges and Opportunities on Renewable Energy Conversion Technologies	Dr.M.Eswaramoorthy Prof. Siddesha. H.S Prof. Kumar BM	52,000/-
	DST-NIMAT (EAC)			
	18	Entrepreneurship Awareness Camp	Dr.M.Eswaramoorthy& Prof .Sunil raj .B.A	20,000/-
	DST-NIMAT(FDP)			
	19	Faculty development program on Entrepreneurship	Dr.M.Eswaramoorthy& Prof .Sunil raj .B.A	2,50,000/-
Total				**10,27,985/-**

- MOU with Mahatma Gandhi Institute of Rural Energy Development.



MEMORANDUM OF UNDERSTANDING

Mahatma Gandhi Institute of Rural Energy and Development (MGIRED)

Srirampura Cross, Jakkur,

Bengaluru - 560 064.

Karnataka, INDIA

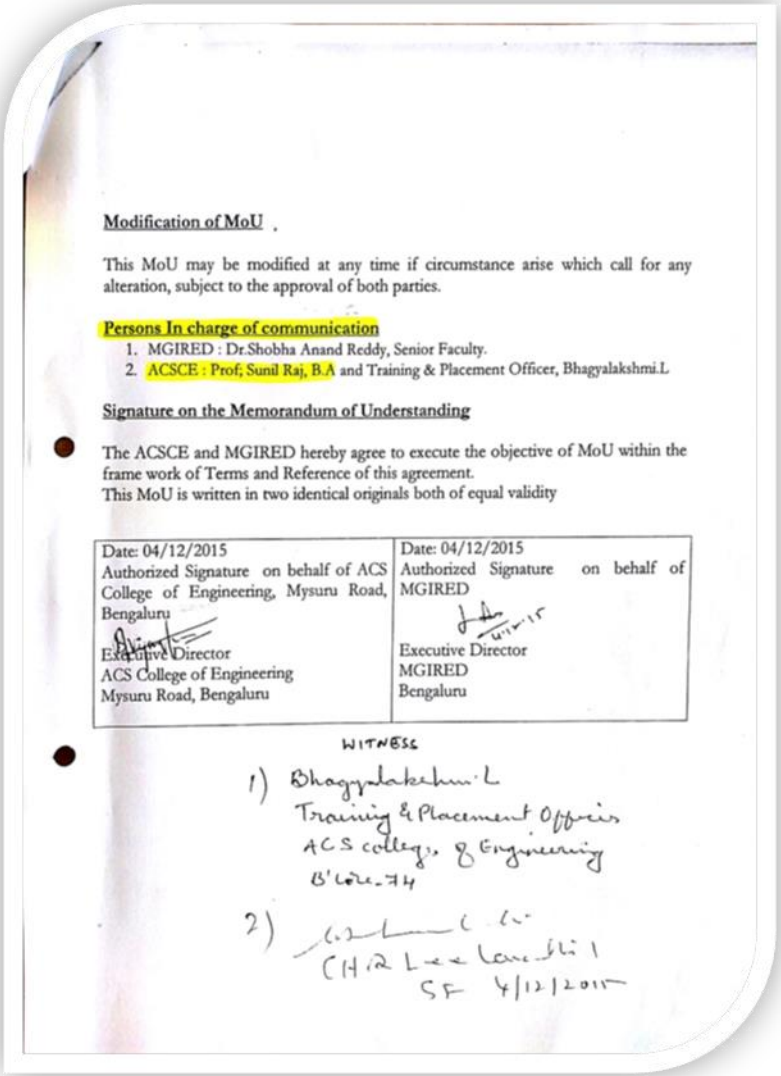
and

ACS College of Engineering

Kambipura, Mysore Road,

Bangalore – 560 074

Memorandum of understanding between **Mahatma Gandhi Institute of Rural Energy and Development (MGIRED), ACS College of Engineering Bengaluru**



Modification of MoU

This MoU may be modified at any time if circumstance arise which call for any alteration, subject to the approval of both parties.

Persons In charge of communication

1. MGIRED : Dr.Shobha Anand Reddy, Senior Faculty.
2. ACSCE : Prof; Sunil Raj, B.A and Training & Placement Officer, Bhagyalakshmi.L

Signature on the Memorandum of Understanding

The ACSCE and MGIRED hereby agree to execute the objective of MoU within the frame work of Terms and Reference of this agreement.
This MoU is written in two identical originals both of equal validity

Date: 04/12/2015 Authorized Signature on behalf of ACS College of Engineering, Mysuru Road, Bengaluru Executive Director ACS College of Engineering Mysuru Road, Bengaluru	Date: 04/12/2015 Authorized Signature on behalf of MGIRED Executive Director MGIRED Bengaluru

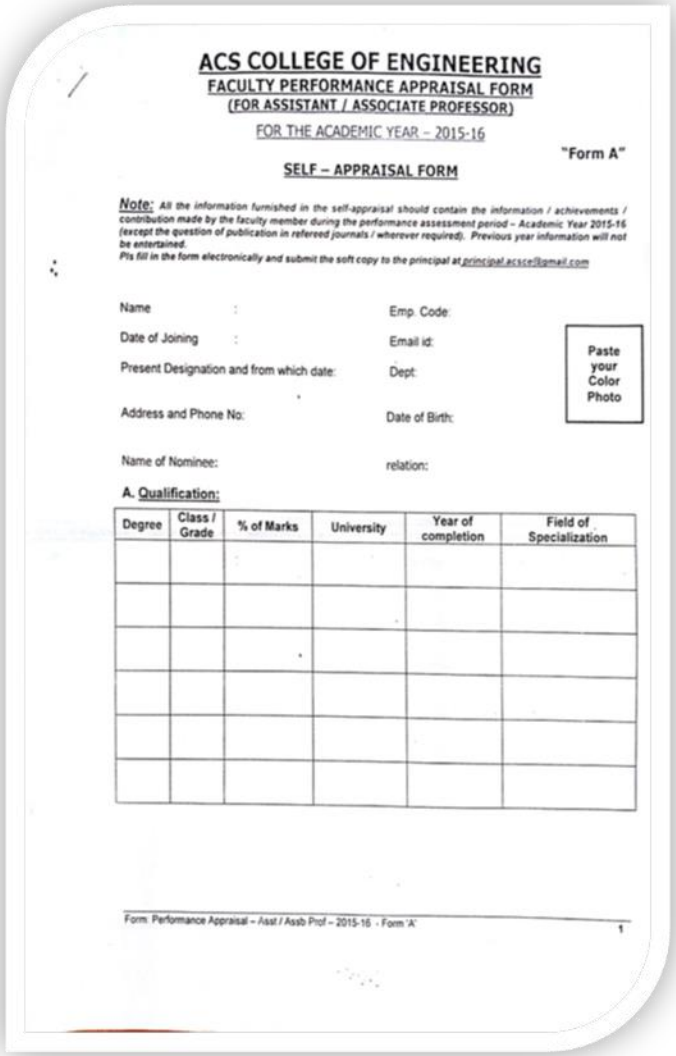
WITNESS

1) Bhagyalakshmi L
Training & Placement Officer
ACS college of Engineering
B'lore-74

2) CH. Lee Lanchhi
SF 4/12/2015

5.8. Faculty performance appraisal and Development system (FPADS)

The Faculty Performance is Evaluated by HOD for every Academic year With the use of appraisal Form A



ACS COLLEGE OF ENGINEERING

FACULTY PERFORMANCE APPRAISAL FORM

(FOR ASSISTANT / ASSOCIATE PROFESSOR)

FOR THE ACADEMIC YEAR – 2015-16

"Form A"

SELF – APPRAISAL FORM

Note: All the information furnished in the self-appraisal should contain the information / achievements / contribution made by the faculty member during the performance assessment period – Academic Year 2015-16 (except the question of publication in refereed journals / wherever required). Previous year information will not be entertained.
Pls fill in the form electronically and submit the soft copy to the principal at principal.acsce@gmail.com

Name : Emp. Code:

Date of Joining : Email id:

Present Designation and from which date: Dept:

Address and Phone No: Date of Birth:

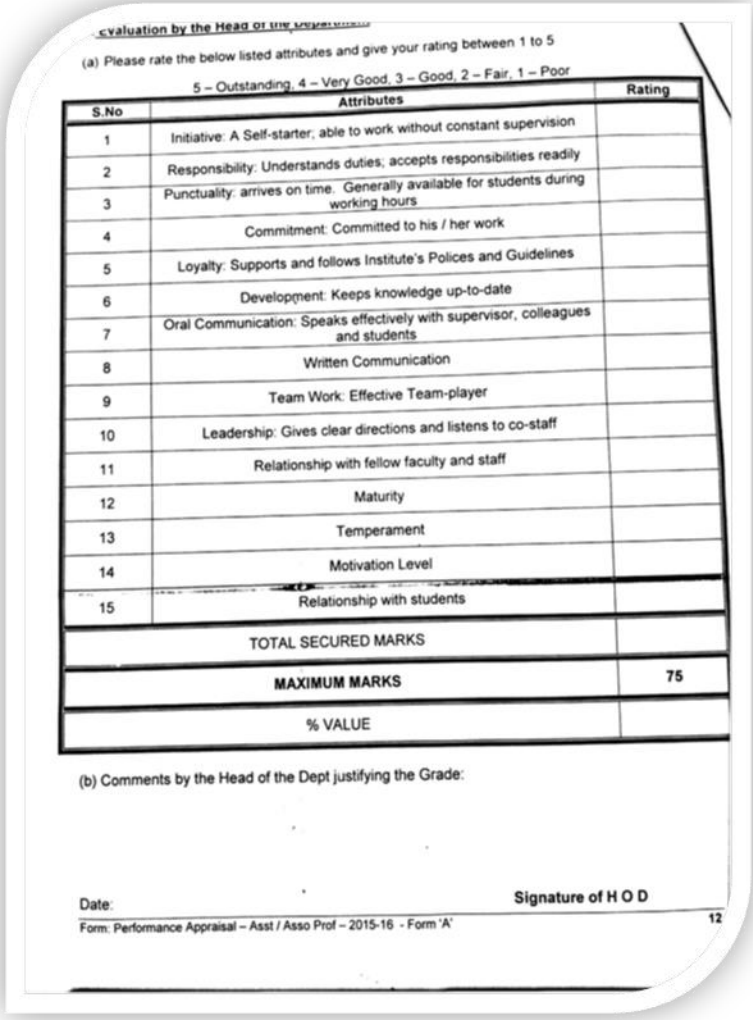
Name of Nominee: relation:

Paste your Color Photo

A. Qualification:

Degree	Class / Grade	% of Marks	University	Year of completion	Field of Specialization

Form: Performance Appraisal – Asst / Assb Prof – 2015-16 - Form 'A' 1



Evaluation by the Head of the Department

(a) Please rate the below listed attributes and give your rating between 1 to 5

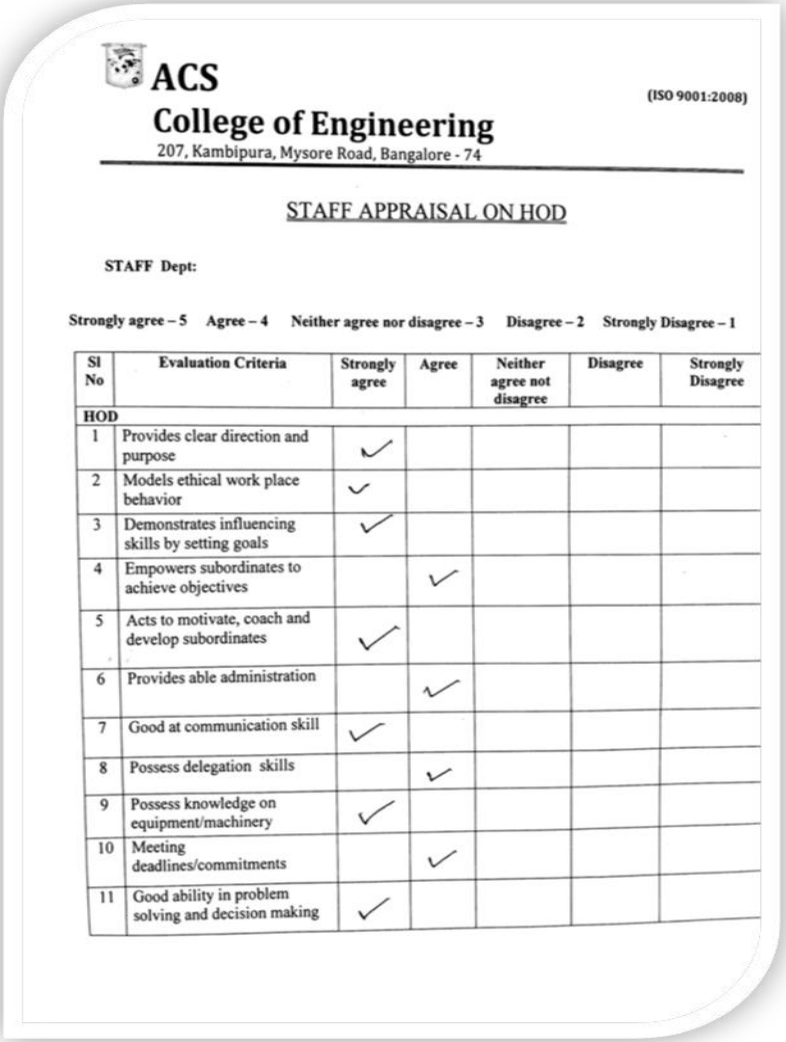
5 – Outstanding, 4 – Very Good, 3 – Good, 2 – Fair, 1 – Poor

S.No	Attributes	Rating
1	Initiative: A Self-starter; able to work without constant supervision	
2	Responsibility: Understands duties; accepts responsibilities readily	
3	Punctuality: arrives on time. Generally available for students during working hours	
4	Commitment: Committed to his / her work	
5	Loyalty: Supports and follows Institute's Polices and Guidelines	
6	Development: Keeps knowledge up-to-date	
7	Oral Communication: Speaks effectively with supervisor, colleagues and students	
8	Written Communication	
9	Team Work: Effective Team-player	
10	Leadership: Gives clear directions and listens to co-staff	
11	Relationship with fellow faculty and staff	
12	Maturity	
13	Temperament	
14	Motivation Level	
15	Relationship with students	
	TOTAL SECURED MARKS	
	MAXIMUM MARKS	**75**
	% VALUE	

(b) Comments by the Head of the Dept justifying the Grade:

Date: **Signature of H O D**

Form: Performance Appraisal – Asst / Asso Prof – 2015-16 - Form 'A' 12



ACS
College of Engineering
207, Kambipura, Mysore Road, Bangalore - 74

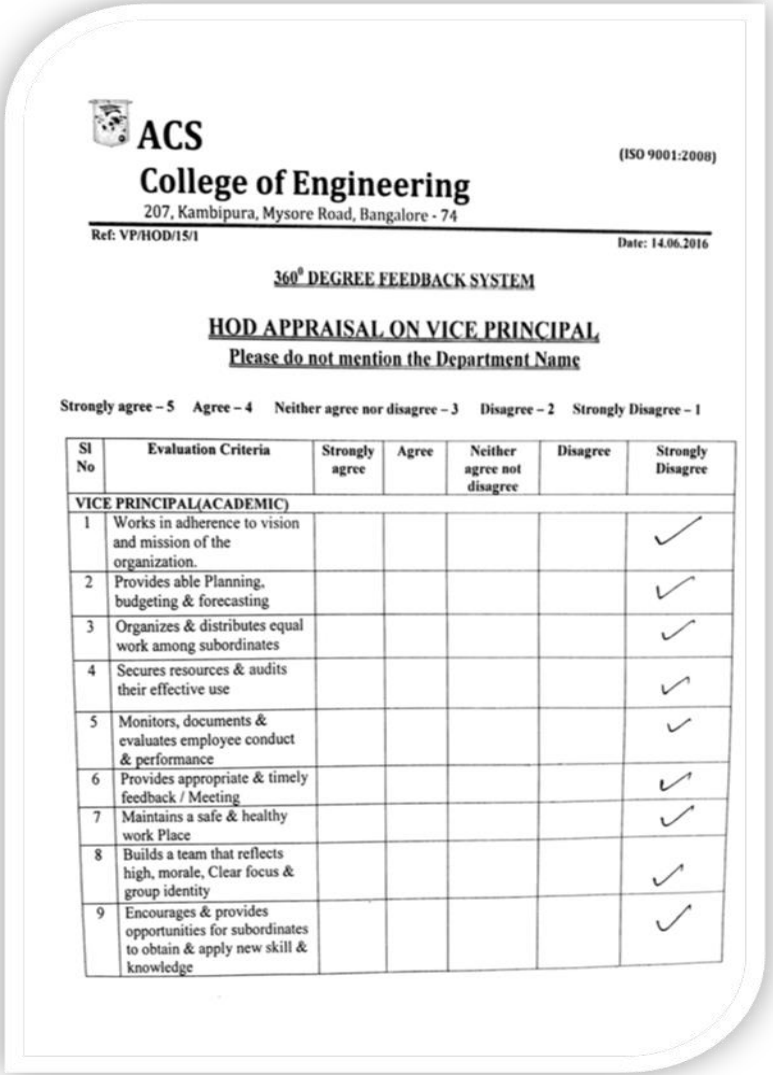
(ISO 9001:2008)

STAFF APPRAISAL ON HOD

STAFF Dept:

Strongly agree – 5 Agree – 4 Neither agree nor disagree – 3 Disagree – 2 Strongly Disagree – 1

Sl No	Evaluation Criteria	Strongly agree	Agree	Neither agree not disagree	Disagree	Strongly Disagree
HOD						
1	Provides clear direction and purpose	✓				
2	Models ethical work place behavior	✓				
3	Demonstrates influencing skills by setting goals	✓				
4	Empowers subordinates to achieve objectives		✓			
5	Acts to motivate, coach and develop subordinates	✓				
6	Provides able administration		✓			
7	Good at communication skill	✓				
8	Possess delegation skills		✓			
9	Possess knowledge on equipment/machinery	✓				
10	Meeting deadlines/commitments		✓			
11	Good ability in problem solving and decision making	✓				



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(ISO 9001:2008)

Ref: VP/HOD/15/1 **Date: 14.06.2016**

360° DEGREE FEEDBACK SYSTEM

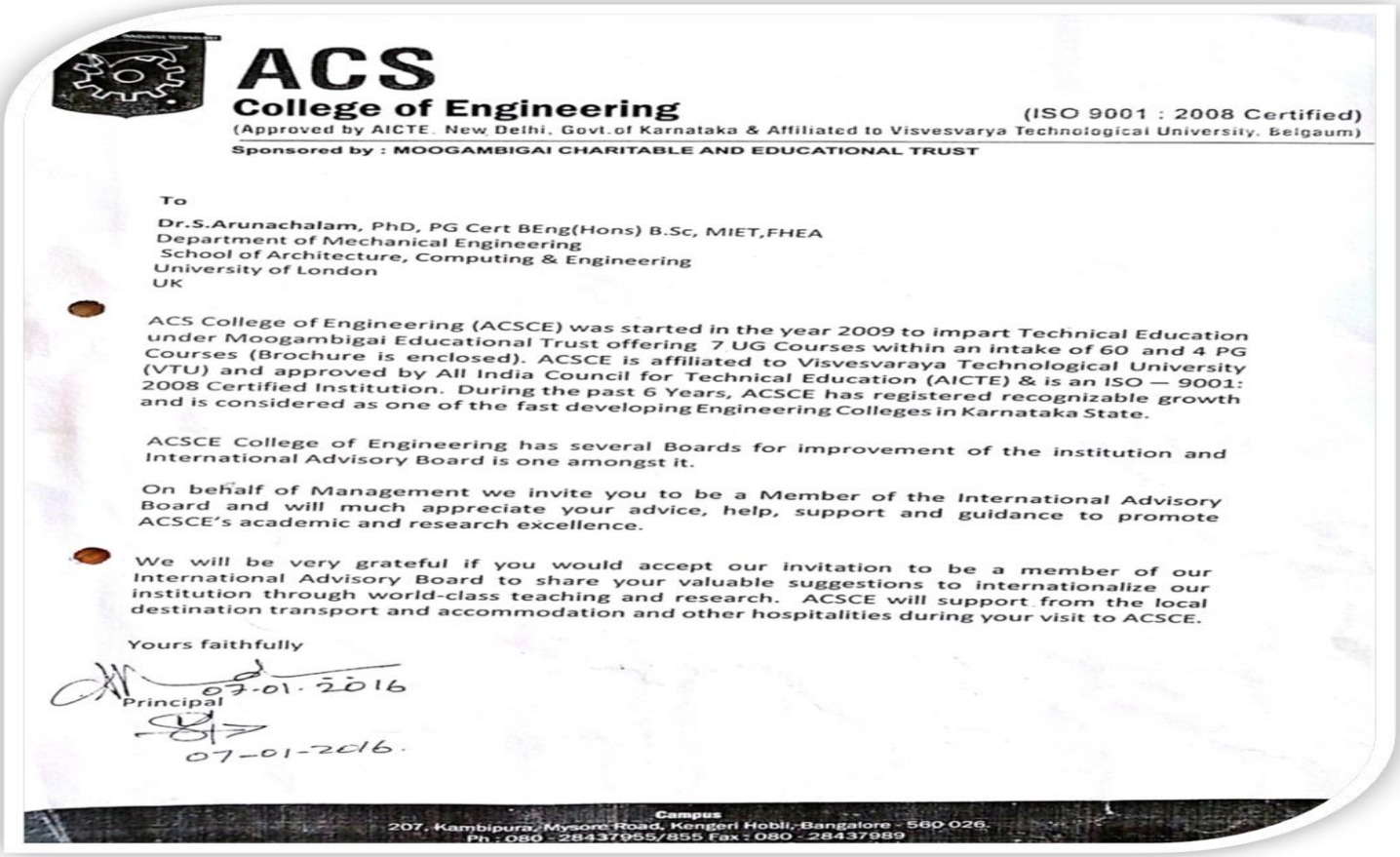
HOD APPRAISAL ON VICE PRINCIPAL
Please do not mention the Department Name

Strongly agree – 5 Agree – 4 Neither agree nor disagree – 3 Disagree – 2 Strongly Disagree – 1

Sl No	Evaluation Criteria	Strongly agree	Agree	Neither agree not disagree	Disagree	Strongly Disagree
VICE PRINCIPAL(ACADEMIC)						
1	Works in adherence to vision and mission of the organization.					✓
2	Provides able Planning, budgeting & forecasting					✓
3	Organizes & distributes equal work among subordinates					✓
4	Secures resources & audits their effective use					✓
5	Monitors, documents & evaluates employee conduct & performance					✓
6	Provides appropriate & timely feedback / Meeting					✓
7	Maintains a safe & healthy work Place					✓
8	Builds a team that reflects high, morale, Clear focus & group identity					✓
9	Encourages & provides opportunities for subordinates to obtain & apply new skill & knowledge					✓

5.9. Visiting / Adjunct / Emeritus Faculty Etc.

S.No	Name of the Resource person
1.	Mr. C.N Patil,M.Tech, Associate GM,CSM Software Bangalore
2	Mr. Suman Bhargav,M.Tech, Sr.Engineer CAE, Bangalore
3	Dr.SubramaniyamArunachalam., PhD , University of East London, school of Architecture,Computing and engineering , Dockland Campus, 4-6 University way, London E16, 2 RD, UK



ACS
College of Engineering

(ISO 9001 : 2008 Certified)

(Approved by AICTE, New Delhi, Govt.of Karnataka & Affiliated to Visvesvarya Technological University, Belgaum)

Sponsored by : MOOGAMBIGAI CHARITABLE AND EDUCATIONAL TRUST

To

Dr.S.Arunachalam, PhD, PG Cert BEng(Hons) B.Sc, MIET,FHEA
Department of Mechanical Engineering
School of Architecture, Computing & Engineering
University of London
UK

ACS College of Engineering (ACSCE) was started in the year 2009 to impart Technical Education under Moogambigai Educational Trust offering 7 UG Courses within an intake of 60 and 4 PG Courses (Brochure is enclosed). ACSCE is affiliated to Visvesvaraya Technological University (VTU) and approved by All India Council for Technical Education (AICTE) & is an ISO — 9001: 2008 Certified Institution. During the past 6 Years, ACSCE has registered recognizable growth and is considered as one of the fast developing Engineering Colleges in Karnataka State.

ACSCE College of Engineering has several Boards for improvement of the institution and International Advisory Board is one amongst it.

On behalf of Management we invite you to be a Member of the International Advisory Board and will much appreciate your advice, help, support and guidance to promote ACSCE's academic and research excellence.

We will be very grateful if you would accept our invitation to be a member of our International Advisory Board to share your valuable suggestions to internationalize our institution through world-class teaching and research. ACSCE will support from the local destination transport and accommodation and other hospitalities during your visit to ACSCE.

Yours faithfully

07-01-2016
Principal

07-01-2016.

Campus
207, Kambipura, Mysore Road, Kengeri Hobli, Bangalore - 560 026.
Ph : 080 - 28437955/855 Fax : 080 - 28437989

CRITERIA 6	Facilities and Technical Support	80

6. FACILITIES AND TECHNICAL SUPPORT (80)

6.1. Adequate and well equipped Laboratories and Technical Manpower (30)

Sr. No.	Name of the Laboratory	No. of students per setup (Batch size)	Name of the Important equipment	Weekly utilization status	Technical Manpower support		
					Name of the technical staff	Designation	Qualification

01.	1st semester/2nd semester Basic Workshop Practice Lab 15WSL16/26	20	**Fitting Shop** ➢ Bench vice (make smith) ➢ Flat fix hacksaw frame ➢ Try square 8” ➢ Try square ➢ Vernier height gauge ➢ Anvil ➢ Swage block **Welding shop** ➢ Chipping hammer ➢ Welding machine ➢ Welding cables ➢ Welding holder ➢ Earthing clamp ➢ Surface flate	27 hrs	Mr. Nandish	Asst. Instructor	I.T.I

02.	1st semester/2nd semester Computer Aided Engineering Lab 15CED14/24	20	➢ ACER LCD Monitor 19"inch ➢ Intel®Core™2 Duo CPU E7500 @ 2.93GHz,0.99 GB of RAM,320GB HDD ➢ Solid Edge software tool version 20 ➢ ACER keyboard and mouse ➢ UPS and Batteries	27 hrs	Mr. Prashanth	Instructor	B.E.

03.	3rd semester Computer Aided Machine Drawing 15 CAMD36	20	➢ ACER LCD Monitor 19"inch ➢ Intel®Core™2 Duo CPU E7500 @ 2.93GHz,0.99 GB of RAM,320GB HDD ➢ Solid Edge software tool version 20 ➢ ACER keyboard and mouse ➢ UPS and Batteries	09 hrs	Mr. Prashanth	Instructor	B.E.

04.	3rd semester Metallography and Material testing Laboratory 10MEL37A	20	➢ Metzer Double Disc Polishing Machine Model Metz – 2002 ➢ Metzer Co-Axial Binocular Research Metallurgical Microscope ➢ Metzer-M Dry Belt Surface model metz-2006 ➢ Metzer-M specimen mounting press model metz-2008 ➢ Wear Testing Machine ➢ Ultrasonic Flaw detector ➢ Magnetic Crack Detector ➢ Dye penetration test apparatus with all solvents ➢ Universal Testing Machine ➢ Torsion Testing Machine ➢ Impact Testing Machine	09 hrs	Mr. Yogesh	Asst. Instructor	I.T.I

05.	3rd semester Foundry and Forging Laboratory 10MEL38A	20	➢ Universal strength machine ➢ Permeability tester, ➢ Core hardness tester, ➢ Mould hardness tester, ➢ Sieve analysis test setup, ➢ Clay content tester, ➢ Moisture content tester, ➢ Centrifugal blower with 5 hp, 2880 rpm motor ➢ Smith chimney fabricated with exhaust blower 2 hp motor	, 09 hrs	Mr. Padmanabha	Asst. Instructor	I.T.I

06.	4th semester Mechanical Measurement and Metrology 10MEL47B	20	➢ Calibration of Thermocouple ➢ Calibration of Pressure gauge Transducer ➢ LVDT displacement transducer ➢ Load cell indicator ➢ Strain measuring system with digital strain- indicator ➢ Tool makers microscope with adjustable vernier ➢ Metzer M profile projector vision plus metz – 806A ➢ Lathe tool Dynamometer ➢ Drill tool dynamometer ➢ Motutoyo make surface roughness tester ➢ Optical flat by Laser fizeau interferometer	09hrs	Mr. Somu	Foreman	B.E.

07.	4th semester Machine Shop 10MEL48B	20	➢ Lathe machine model Mac-power ➢ Milling machine with extra electrical vertical attachment ➢ Shaping machine 18" stroke pulley drive ➢ Surface Grinder mechanical-M1020, Radial drilling machine ➢ Bench Grinding machine ➢ Lathe machine with 4 jaw chuck set up ➢ Hacksaw machine – Hydraulic ➢ Hacksaw machine - Electrical	09hrs	Mr. Nandish	Asst. Instructor	I.T.I

08.	5th semester Fluid Mechanics and Machines lab 10MEL57	20	➢ Impact of jet on vanes ➢ Pelton wheel turbine ➢ Francis turbine ➢ Kaplan turbine ➢ Single and multi stage centrifugal pump ➢ Reciprocating pump ➢ Venturimeter ➢ Orifice meter ➢ Air Blower test rig	09 hrs	Mr.Ramakrishnappa	Instructor	I.T.I

09.	5th Semester Energy Conversion Engineering Lab 10MEL58	20	➢ Abels-flash point Apparatus ➢ Penskey Martin Apparatus ➢ Redwoods Viscometer ➢ Saybolts Viscometer ➢ Torsion Viscometer ➢ Planimeter ➢ Bomb calorimeter ➢ Gas calorimeter for calorific values of gaseous fuel ➢ 4 stroke Single cylinder Diesel Engine Test Rig water cooled with Mechanical Loading ➢ 2 stroke single cylinder petrol engine test Rig ➢ 4- stroke single cylinder petrol engine test rig	09 hrs	Mr. Ramesh	Instructor	Diploma

10.	6th semester Heat and Mass Transfer Lab 10MEL67	20	➢ Metal Rod Apparatus ➢ Composite walls apparatus ➢ Emissivity measurement apparatus ➢ Stefan Boltzman apparatus, ➢ Critical Heat flux apparatus ➢ Drop and film wise condensation apparatus ➢ Pin fin apparatus ➢ Natural convection apparatus ➢ Forced convection	09 hrs	Mr. Ramesh	Instructor	Diploma

11.	6th semester Computer Aided Modeling Lab 10MEL68	20	➢ ACER ,LCD Monitor 19 inch ➢ Intel®Core™2 Duo CPU E7500 @ 2.93GHz,0.99 GB of RAM,320GB HDD ➢ ACER Keyboard ➢ ACER Mouse ➢ Ansys Software tool version13 ➢ Batteries and UPS	09 hrs	Mr.Manjappa	Instructor	Diploma

12.	7th semester Design Lab 10MEL77	20	➢ Universal Vibration ➢ Balancing of rotating masses ➢ Whirling of shaft apparatus ➢ Polariscope ➢ Universal governor apparatus ➢ Journal bearing ➢ Curved beam apparatus ➢ Strain rossets ➢ Strain gauges ➢ Gyroscope ➢ Dead weights	09 hrs	Mr. Somu	Foreman	B.E.

13.	7th semester CIM and Automation Lab 10MEL78	20	➢ ACER, LCD Monitor 19"inch ➢ Intel®Core™2 Duo CPU E7500 @ 2.93GHz, 0.99 GB of RAM, 320GB HDD ➢ ACER Keyboard, ACER Mouse, ➢ CAM Software Package for Simulation by SWAN SOFT CNC Training Simulator Version 6.35-licencesed ➢ Batteries and UPS	09 hrs	Mr.Manjappa	Instructor	Diploma

6.2. Additional facilities created for improving the quality of learning experience in Laboratories (25)

Sr. No.	Facility Name	Details	Reason(s) for creating facility	Utilization	Areas in which students are expected to have enhanced learning	Relevance to POs

1.	Smart Class Room	Fully equipped shared Smart Class room with LCD projector and software's with the seating capacity of 80. Comfortable desks, chairs and teaching aids. Glass board, Fan, Tube light, chalk board	For better under standing of Computer Aided Engineering Drawing lab and Computer Aided Machine Drawing lab, and Computer Aided Analysis and Modeling Lab, Computer Integrated Manufacturing and Automation Lab. the students can verify theoretical concepts in a practical environment by providing e-learning through online Web courses and Video lectures in Engineering, Sciences, Technology .	Per Semester 15 hrs	➢ Solid modeling ➢ Assembly modeling ➢ Orthographic view ➢ Structural analysis ➢ Dynamic studies ➢ Finite elements for model behavior ➢ Supports material models ➢ Equation solvers for a mechanical design problems ➢ Thermal analysis ➢ Thermo structural analysis ➢ To exhibit real-time 3D CNC machine system simulation	P02, P03, P05

2.	Seminar Hall	Fully equipped shared seminar hall with Computer, Projector, Student Desk, White Board, Air conditioner, Fan, Cushion chair, Mic, Speaker, LED lights, Podium,	For better understanding of Computer Aided Engineering Drawing lab and Computer Aided Machine Drawing lab, and Computer Aided Analysis and Modeling Lab, Computer Integrated Manufacturing and Automation Lab. the students can verify theoretical concepts in a practical environment by providing e-learning through online Web courses and Video lectures in Engineering, Sciences, Technology	Per Semester 12 hrs	➢ Solid modeling ➢ Assembly modeling ➢ Orthographic view] ➢ Structural analysis ➢ Dynamic studies ➢ Finite elements for model behavior ➢ Supports material models ➢ Equation solvers for a mechanical design problems ➢ Thermal analysis ➢ Thermo structural analysis ➢ To exhibit real-time 3D CNC	P02, P03, P05

3.	Manual facilities	Provided manuals for Workshop practice, Foundry Forging, Material Testing, Machine shop, Energy conversion lab, Fluid Machinery lab, CAMA lab, HMT lab, Design lab, CIM and Automation lab	The students will understand the content of each lab in advance. It will acts as a guidelines, instruction, handbook, to undertake the each experiments in each lab. To tabulate the obtained value by each experiments.	Complete semester	➢ For better understanding all the experiments ➢ Tabulating the obtained data ➢ Do's and Don'ts ➢ Safety measures	P03, P04
4.	E Journals facility	IEEE, Springer, J-gate, Nimbus	For research and project activities. To know about recent trends in science and technology	Complete semester is opened to utilize	➢ Research activity ➢ Recent trends in engineering ➢ Project activity	P02,P05, P06

5.	English learning language class	The English faculty is deputed to teach basic English for the first year students to make them to understand regular engineering concepts clearly.	To increase communication skill	Per semester 30 hrs	➢ Understanding the concepts clearly ➢ To communicate with the faculty for better understanding the subjects.	P01, P02, P10

6.	Department Library	Having collection of ➢ Text Books, ➢ Reference Books ➢ Journals ➢ Project / seminar report.	➢ To meet the needs of the students ➢ To provide reference facilities ➢ To refer advanced information for seminar, laboratory, projects ➢ To know about the past research activities undertaken by the students	Complete semester is opened to utilize	➢ Design ➢ Thermal ➢ Production ➢ Manufacturing ➢ Automation ➢ Automobile ➢ Drawing	P01, P02, P05

7.	MAT LAB version R2012A.	Control system version 9.3 25 users. Simulink version 7.9 25 users.	In addition to the VTU curriculum, students can verify theoretical concepts in a practical environment. It is helpful for the analysis of problems in control systems, basic engineering mechanics, statics and dynamics, mechanical vibrations, electrical circuits, and numerical methods.	Complete semester is opened to utilize	➢ Modeling the equation for the Design engineering problems ➢ Modeling the equation for Thermal and Fluid Mechanics fields	P03, P05

8.	Solar Thermal Research Laboratory (VGST Lab)	Having the facilities of Solar V-trough Solar Air heater, Solarimeter, Solar photovoltaic panel, Thermoelectric module	To conduct research activities in solar energy and create awareness to the students and rural people about the importance of solar energy. To provide consultancy service to the rural people.	Complete semester is opened to utilize	➢ Performing tests on photovoltaic systems ➢ Cost analysis of solar photo voltaic system ➢ Modeling and analysis of solar panel ➢ Reliability analysis of solar air heater with thermal storage system	P05, P08 P12

9.	Research and Development lab and Project lab	Student's project models are guided by our faculty members. These models which is based on: ➢ Composite materials ➢ Solar energy ➢ Power Transmission ➢ Automation Technology	➢ Real time application ➢ To create innovative ideas ➢ To build the creative skills ➢ Increase the interest on engineering	Complete semester is opened to utilize	➢ Innovation ➢ Creativity ➢ Skill development ➢ Entrepreneurship ➢ Ideas generation	P02, P03, P04, P05

6.3. Laboratories: Maintenance and Overall Ambiance (10)

1. Department has enough labs which are used for all the years on timetable basis to meet the curriculum requirements
2. The courses which have practical work will be provided labs every week.
3. Conditions of chairs/benches are in good condition. Chair with desk are provided for individual students in Labs.
4. Labs are equipped with sufficient hardware and licensed software to run program specific curriculum and off program curriculum.
5. Sufficient laboratory manual are distributed to students.

6. Sufficient number of windows is available for ventilation and natural light and every lab has one exit.
7. Lighting system is very effective, along with the natural light in every corner of the rooms.
8. Emergency light connections available in Lab in case of power failure.
9. Cup-boards are available in each lab for students to place their belongings.
10. Each Lab is equipped with white/black board, computer, Internet, and such other amenities.
11. Research laboratory is available 24X7 for all faculties and students to carry research work and projects.
12. Exclusively a project lab has been provided for the students to carry out their mini and major project work.

6.4. Project Laboratory (5)

Sr. No.	Name of the Facilities	Utilization
1.	Solid Edge Version 20	1st, 2nd, 3rd semester students, PG students, Research scholars and Faculty members.
2.	ANSYS Version 13	6th semester students, PG students, Research scholars and Faculty members.
3.	Swan Soft CNC Training Simulator Version 6.35	7th, 8th semester students, PG students, Research scholars and Faculty members.
4.	Solar Thermal Research Laboratory	7th, 8th semester students, PG students, Research scholars and Faculty members.
5.	MAT LAB version R2012A.	7th, 8th semester students, PG students, Research scholars and Faculty members,

6.	Material Testing and Metallographic Lab	3rd semester, PG students, Research scholars and Faculty members

6.5. Safety Measures in Laboratories (10)

Sr. No.	Name of the Laboratory	Safety measures

1.	Workshop Practice Lab	. • General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Hand gloves, Safety shoes, Welding goggles, should be used in the lab • Loose clothing and jewels etc. are prohibited • long hair must be completely covered

2.	CAED /CAMD Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Apron. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Proper PC system is used.

3.	Material Testing and Metallographic Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Hand gloves, Safety shoes, Welding goggles, should be used in the lab • Loose clothing and jewels etc. are prohibited

4.	Foundry Forging Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Hand gloves, Safety shoes, Welding goggles, should be used in the lab • Loose clothing and jewels etc. are prohibited

5.	Machine shop Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Safety shoes, Welding goggles, should be used in the lab • Loose clothing and jewels etc. are prohibited

6.	Mechanical Measurement and Metrology Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Safety shoes, Welding goggles, should be used in the lab • Loose clothing and jewels etc. are prohibited

7.	Fluid Mechanics and Machines Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Safety shoes, Welding goggles, should be used in the lab • Loose clothing and jewels etc. are prohibited

8.	Energy Conversion Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Safety shoes, Welding goggles, should be used in the lab • Loose clothing and jewels etc. are prohibited

9.	Heat and Mass Transfer Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Safety shoes, Welding goggles, should be used in the lab • Loose clothing and jewels etc. are prohibited

10.	CAMA Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Apron. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. Proper PC system is used.

11.	Design Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Uniform. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. • Safety shoes, Welding goggles, should be used in the lab • Loose clothing and jewels etc. are prohibited

12.	CIM and Automation Lab	• General Rules of Conduct in Laboratories are displayed. • Specific Safety Rules for students displayed. • First aid box, Fire extinguisher & Hand gloves are kept in each laboratory. • Students are wearing Lab Apron. • Well trained technical supporting staff. • Avoiding the use of damaged equipments and provides needful equipments and components. • Periodical servicing of the lab equipments. • Maintain a clean and organized laboratory, • Avoiding the use of cell phones. • Appropriate storage areas. Proper PC system is used.

CRITERIA 7

CONTINUOUS IMPROVEMENT

CRITERIA 7	**Continuous Improvement**	**50**

7. CONTINUOUS IMPROVEMENT (50)

7.1. Actions taken based on the results of evaluation of each of the POs & PSOs (20)

Identify the areas of weaknesses in the program based on the analysis of evaluation of POs & PSOs attainment levels. Measures identified and implemented to improve POs & PSOs attainment levels for the assessment years.

Actions to be written as per table in 3.3.2.

Examples of analysis and proposed action

Sample 1-Course outcomes for a laboratory course did not measure up, as some of the lab equipment did not have the capability to do the needful. Action taken-Equipment up-gradation was carried out.

Sample 2-In some course student performance has been consistently low with respect to some COs. Analysis of answer scripts and discussions with the students revealed that this could be attributed to a weaker course on vector calculus.

Action taken-revision of the course syllabus was carried out (instructor/text book changed too has been changed, when deemed appropriate).

Sample 3-In a course that had group projects it was determined that the expectations from this course about PO3 were not realized as there were no discussions about these aspects while planning and execution of the project. Action taken-Project planning, monitoring and evaluation included in rubrics related to these aspects.

Courses		Program outcomes											
THIRD SEMESTER													
Material Science & Metallurgy		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME32A	**Set Target**	**2.5**	**2**	**1.5**	**2.33**	**1.3**	**2**	**1.5**	**1.25**	**1.5**	**0**	**1.25**	**0**
	Attained	1.35	0.80	0.41	0.94	0.52	0.25	0.39	0.68	0.41	0	0.685	0
Basic Thermodynamics		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME33	**Set Target**	**3**	**3**	**3**	**0**	**00**	**1**	**0**	**0**	**1**	**1**	**1**	**0**
	Attained	3.27	3.27	3.27	0	0	1.09	0	0	1.09	1.09	1.09	0
Mechanics of Materials		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME34	**Set Target**	**3**	**3**	**2**	**0**	**0**	**1**	**0**	**1**	**0**	**1**	**1**	**0**
	Attained	**2.31**	**2.03**	**1.84**	**0.47**	**0.26**	**0.67**	**0.19**	**0.34**	**0.75**	**0.545**	**0.887**	**0.00**
Manufacturing Process – I		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME35	**Set Target**	2	1				1		1		2	1	
	Attained	**1.17**	**0.58**	**0**	**0**	**0**	**0.58**	**0**	**0.58**	**0**	**1.178**	**0.589**	**0.00**
Computer Aided Machine Drawing		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME36A	**Set Target**	**2**	**2.5**	**2.5**		**3**			**1**		**2**		

	Attained	0.71	0.71	2.15	0	2.15	0	0	0.45	0	0.71	0	0
Metallography & Material Testing Lab		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10MEL37	**Set Target**	**2**	**2.25**	**2.25**		**2.5**							**1**
	Attained	1.41	1.6	1.59	0	1.77	0	0	0	0	0	0	0
Foundry & Forging Lab		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10MEL38	**Set Target**	**2**	**2**	**2**	**2**	**1**			**1**	**2**	**1**	**1**	
	Attained	1.85	1.85	1.85	1.8	0.92	0	0	0.92	1.85	0.92	0.92	0

FOURTH SEMESTER													
Mechanical Measurements & Metrology		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME42	**Set Target**	**2**	**2**	**2**	**2**	**1**			**1**	**2**	**1**	**1**	**2**
	Attained	1.8	1.8	1.8	1.9	0.92	0	0	0.92	1.85	0.929	0.92	0
Applied Thermodynamics		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME43	**Set Target**	**2.66**	**2.66**	**1**			**1**		**1**		**1**	**1**	
	Attained	1.25	1.25	0.46	0	0	0.46	0	0.46	0	0.468	0.468	0
Kinematics of Machines		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME44	**Set Target**	**2.25**	**3**	**2.5**			**1**		**1**		**1.25**	**1**	
	Attained	1.59	1.60	1.77	0	0	0.70	0	0	0	0	0	0.345
Manufacturing Process – II		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME45	**Set Target**	**3**	**1.5**			**0.5**					**1**		
	Attained	2.12	1.05	0	0	0.70	0	0	0	0	0.709	0	0
Fluid Mechanics		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME46B	**Set Target**	**3**	**3**	**1**							**1**		
	Attained	1.12	1.12	0.37	0	0	0	0	0	0	0.375	0	0
Mechanical Measurements &		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12

Metrology Lab													
10MEL47B	**Set Target**	**3**	**3**	**3**	**3**	**1**							
	Attained	2.80	2.80	2.80	2.80	0.93	0	0	0	0	0	0	0
Machine Shop		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10MEL48B	**Set Target**	2	2	2	2	1			1	2	1	1	
	Attained	1.85	1.85	1.85	1.85	0.92	0	0	0.9	1.85	0.929	0.929	0

FIFTH SEMESTER													
Management & Entrepreneurship		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10AL51	**Set Target**	**1**					**3**	**2**	**1**	**1**	**3**	**1**	**3**
	Attained	1.3	0	0	0	0	4.00	2.67	1.33	1.33	4.00	1.33	2.79
Design of Machine Elements – I		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME52	**Set Target**	**3**	**3**	**2**			**1**		**1**		**1**	**1**	
	Attained	1.26	1.26	0.84	0	0	0.42	0	0.42	0	0.421	0.421	0
Energy Engineering		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME53	**Set Target**	**1**	**1**				**3**	**2**			**2**		
	Attained	0.59	0.59	0	0	0	2.38	1.58	0	0	1.58	0	0
Dynamics of Machines		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME54	**Set Target**	**3**	**3**	**2**			**1**		**1**		**1**	**1**	
	Attained	1.26	1.26	0.84	0	0	0.42	0	0.42	0	0.421	0.421	0
Manufacturing Process – III		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME55	**Set Target**	**3**	**3**	**2**			**1**		**1**		**1**	**1**	
	Attained	2.25	2.25	1.5	0	0	0.75	0	0.7	0	0.75	0.750	0
Turbo Machines		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME56	**Set Target**	**3**	**3**	**1**			**1**		**1**		**1**	**1**	

	Attained	2.39	2.39	0.79	0	0	0.79	0	0.79	0	0.798	0.798	0
Fluid Mechanics & Machines Laboratory		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10MEL57	**Set Target**	**3**	**3**	**2**			**1**		**1**		**1**	**1**	
	Attained	1.26	1.26	0.84	0	0	0.42	0	0.42	0	0.421	0.421	0
Energy Conversion Engineering Lab		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10MEL58	**Set Target**	2	2	2	2	1			1	2	1	1	
	Attained	1.85	1.85	1.85	1.85	0.92	0	0	0.9	1.85	0.929	0.929	0

SIXTH SEMESTER													
Computer Integrated Manufacturing		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME61	**Set Target**	**1.75**	**1.5**						**1**		**1**	**1**	
	Attained	1.39	1.19	0	0	0	0	0	0.80	0	0.800	0.800	0
Design of Machine Elements - II		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME62	**Set Target**	3	2	3		1			3				3
	Attained	1.47	0.98	1.47	0	0.49	0	0	1.47	0	0	0	1.476
Heat & Mass Transfer		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME63	**Set Target**	1.75	1.5						1		1	1	
	Attained	1.30	1.42	1.07	0	0	0	0	0	0	0.47	0	0
Finite Element Methods		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME64	**Set Target**	**3**	**3**	**2**			**1**		**1**		**1**	**1**	
	Attained	2.25	2.25	1.50	0	0	0.75	0	0.75	0	0.75	0.750	0
Mechatronics & Microprocessor		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME65	**Set Target**	**2.5**						**3**			**1**	**1**	
	Attained	1.55	0	0	0	0	0	1.86	0	0	0.62	2.95	0
Non-Traditional Machining		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME665	**Set Target**	**3**	**3**	**3**			**1**		**1**		**2**	**3**	

	Attained	1.18	1.18	1.18	0	0	0.39	0	0.39	0	0.793	1.189	0
Heat & Mass Transfer Laboratory		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10MEL67	**Set Target**	**3**	**3**	**1**			**1**		**1**		**1**	**1**	
	Attained	2.39	2.39	0.79	0	0	0.79	0	0.79	0	0.798	0.798	0
Computer Aided Modelling & Analysis Laboratory		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10MEL68	**Set Target**	**3**	**2**	**3**		**1**			**2**				**2**
	Attained	1.93	1.29	1.93	0	0.64	0	0	1.29	0	0	0	1.29

SEVENTH SEMESTER

Engineering Economy		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME71	**Set Target**	**1.33**	**1.33**						**1**		**1**	**1**	
	Attained	1.61	1.88	0	0	0	0	0	1.34	0	1.34	1.343	0
Mechanical Vibrations		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME72	**Set Target**	**3**	**3**	**3**			**1**		**1**		**2**	**3**	
	Attained	1.18	1.18	1.18	0	0	0.39	0	0.39	0	0.793	1.189	0
Hydraulics & Pneumatics		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME73	**Set Target**	**3**	**3**	**1**			**1**		**1**		**1**	**1**	
	Attained	2.39	2.39	0.79	0	0	0.79	0	0.79	0	0.798	0.798	0
Operation Research		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME74	**Set Target**	**3**	**2**	**2**			**1**		**1**		**1**	**1**	
	Attained	1.49	0.99	0.99	0	0	0.49	0	0.49	0	0.498	0.498	0
Non-Conventional Energy Sources		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME754	**Set Target**	2.44	2.1	2.5			1		1		1.33	1.66	
	Attained	1.23	0	2.47	1.23	0	1.85	2.77	2.77	0	0.926	2.159	0.926
Experimental Stress Analysis		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12

10ME761	**Set Target**	**2.75**		**2.25**	**2.25**	**2.25**		**2.5**	**2.25**			**1.5**	
	Attained	2.91	0	2.21	2.22	2.49	0	2.7	2.25	0	0	1.68	0

EIGHT SEMESTER

Operation Management		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME81	**Set Target**	**1.25**	**1.25**						**1**		**1**	**1**	
	Attained	0.81	0.81	0	0	0	0	0	0.65	0	0.652	0.652	
Control Engineering		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME82	**Set Target**	**2.25**	**2.25**	**2**			**1**		**1**		**2**	**1**	
	Attained	1.45	1.45	0.32	0	0	0.64	0	0	0	0	0	0
Power Plant Engineering		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME833	**Set Target**	**1**	**1**				**3**	**2**			**2.666**	**1**	
	Attained	0.62	0.62	0	0	0	2.80	1.87	0	0	2.494	0.93	0
Automotive Engineering		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME844	**Set Target**	**2.25**	**2.25**	**2**			**1**		**1**		**2**	**1**	
	Attained	0.62	0.62	0.35	0	0	2.80	0	0.62	0	2.494	0.93	0
Project Work		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME85	**Set Target**	**1.25**	**1.25**						**1**		**1**	**1**	
	Attained	0.62	0.62	0	0	0	0	0	2.67	0	2.494	0.93	0

Seminar		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12
10ME86	Set Target	1.25	1.25						1		1	1	
	Attained	0.62	0.62	0	0	0	0	0	2.67	0	2.494	0.93	0

POs Attainment Levels and Actions for improvement – CAY

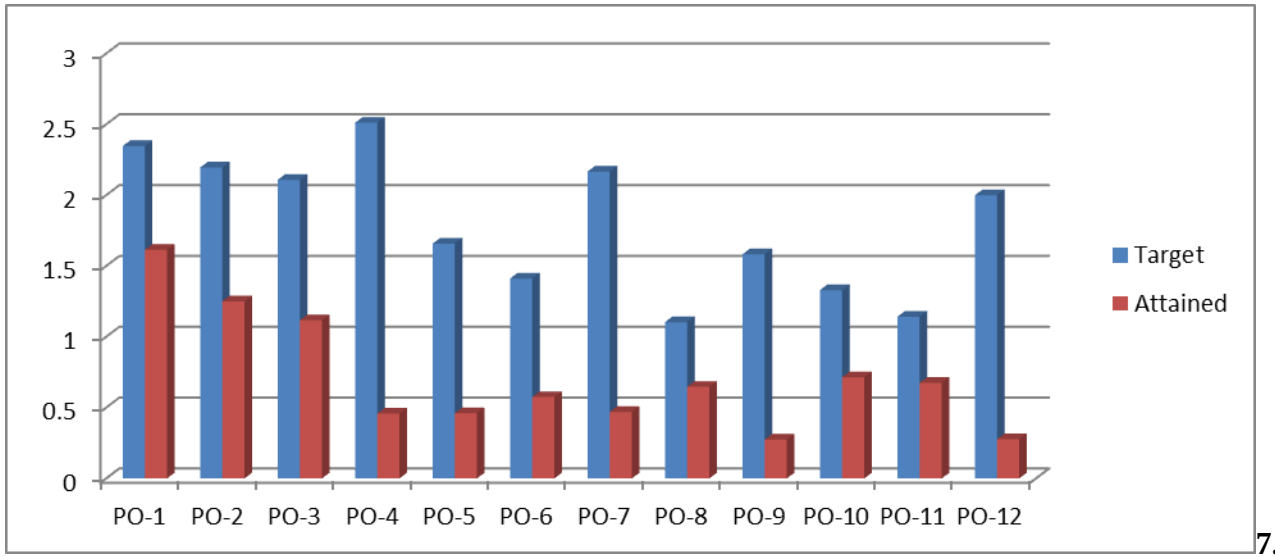
PO's	Target Level	Attainment level	Observations
PO1:	2.346801	1.613675	
Action1			
PO2:	2.19537	1.251321	
Action1			
PO3:	2.108696	1.116748	
Action1			
PO4:	2.511905	0.457797	
Action1			
PO5:	1.658333	0.460942	
Action1			
PO6:	1.411765	0.574776	
Action1			

PO7:	2.166667	0.469557	
Action1			
PO8:	1.104167	0.647192	
Action1			
PO9:	1.583333	0.273978	
Action1			
PO10:	1.330357	0.714463	
Action1			
PO11:	1.142361	0.675412	
Action1			
PO12:	2	0.27709	
Action1			

Table Showing POs target and attained level

Sl No	Pos	Target	Attained
1	PO-1	2.346801	1.613675
2	PO-2	2.19537	1.251321
3	PO-3	2.108696	1.116748
4	PO-4	2.511905	0.457797
5	PO-5	1.658333	0.460942
6	PO-6	1.411765	0.574776
7	PO-7	2.166667	0.469557

8	PO-8	1.104167	0.647192
9	PO-9	1.583333	0.273978
10	PO-10	1.330357	0.714463
11	PO-11	1.142361	0.675412
12	PO-12	2	0.27709



7.1

Figure - POs Attainment of Target level to Attained level

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

POs Attainment levels & actions for improvement (2015-16) CAY

<table>
<tr><th>POs</th><th>Target level</th><th>Attainment level</th><th>Observations</th></tr>
<tr><td colspan="4">PO1: Demonstrate Knowledge of Mathematics such as Multi variable calculus, Differential Equations Science and Engineering.</td></tr>
<tr><td>PO1</td><td>2.34</td><td>1.61</td><td>Achieved Attainment is low in the few subjects in the following subjects:
10ME52, 10ME62, 10ME46B, 10ME56, 10ME33, 10ME34,10ME44
Observations :
1. Students are not exposed to basic fundamental in the mathematical /Problem Oriented Subjects.
2. Students find it difficult to solve design related subjects.
3. Basic knowledge of analysis is not well understood.
4. Subject involves both analysis and design which confuses.
5. Solving design procedure problems found to be lengthy at times.
6. Diploma (Lateral Entry) Students find difficulty in solving higher integration problems.</td></tr>
<tr><td colspan="4">Actions
1. Additional classes to be conducted to introduce Mechanical engineering fundamental.
2. More design and analysis classes to be tought in tutorial classes.
3. More emphasis on mathematical basic to be given in the previous course.
4. Practical approach of teaching to be adapted.
5. More problems will be given for practice.</td></tr>
<tr><td colspan="4">PO2: Demonstrate an ability to identify, formulate and solve mechanical engineering problems.</td></tr>
<tr><td>PO2</td><td>2.19</td><td>1.25</td><td>Attainment is low in the following subjects :
10ME844,10ME56 ,10ME52, 10ME82</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>Observations :
1. Lateral entry Students are not exposed to basic of engineering mathematics
2. Students find it difficult to solve the engineering problems
3. Basic knowledge of design is not well understood
4. Subject involves both analysis and design
5. Solving design problems found to be lengthy</td></tr>
<tr><td colspan="4">Actions
1. Additional classes to be conducted to introduce Mechanical Engineering fundamental.
2. More design classes to be taught in tutorial classes
3.More emphasis on mathematical basic to be given in the previous course
4. Practical approach of teaching to be adapted.
5. More problems will be given as part of assignment and the same will be monitored on a regular basis.
6. Regularly appeared questions will be solved in the classes.</td></tr>
<tr><td colspan="4">PO3: Model, Analyze, Design and realize Physical systems, components or processes.</td></tr>
<tr><td>PO3</td><td>2.10</td><td>1.116</td><td>Attainment can be improved in the following subjects:
10ME35,10ME45,10ME36A,10ME42B

Observations :
1. Lateral entry Students are not exposed to basic of Engineering Mathematics
2. Students find it difficult to solve the engineering problems3.
3. Basic knowledge of design is not well understood.
4. Subject involves both analysis and design.
5. Solving design problems found to be lengthy</td></tr>
<tr><td colspan="4">Actions
1. Material /Manufacturing Processes are taught with the help of NPTEL video presentation.
2. Additional classes to be conducted to introduce Mechanical Engineering fundamental.
3. More design classes to be taught in tutorial classes
4. 3.More emphasis on mathematical basic to be given in the previous course
5. Practical approach of teaching to be adapted.
6. More problems will be given for assignment practice.</td></tr>
</table>

<table>
<tr><td colspan="4">PO4: Plan and conduct an experimental program and evaluate the results.</td></tr>
<tr><td>PO4</td><td>2.51</td><td>1.457</td><td>Attainment can be improved in the following subjects

Observations :

1. Lateral entry Students are not exposed to basic of engineering mathematics
2. Students find it difficult to solve the engineering problems
3. Basic knowledge of design is not well understood
4. Subject involves both analysis and design
5. Solving design problems found to be lengthy</td></tr>
<tr><td colspan="4">Actions
1. Additional classes to be conducted to introduce Mechanical engineering fundamental.
3.More emphasis on mathematical basic to be given in the previous course
4. Practical approach of teaching to be adapted.
5. More problems will be given for practice.
5Conduction of Science Fest and motivating students to prepare/built prototype models .</td></tr>
<tr><td colspan="4">PO5: Use Modern Engineering Tools, Software’s and equipment’s to analyze problems.</td></tr>
<tr><td>PO5</td><td>2.167</td><td>0.46</td><td>Attainment can be improved in the following subjects :
10ME61, 10ME36A,10CED14/24

Observations :
1. Time bound constraints.
2. Lateral entry Students are not exposed to basic of Engineering.
3. Basic knowledge of design is not well understood.
4. Solving Assembly Drawings problems found to be lengthy.</td></tr>
<tr><td colspan="4">Actions
1. Additional classes to be conducted to introduce practical knowledge.
2. Students should be given individual Systems to work on software’s.
3. Use of Projector will be more benefitted.
4. More problems will be given for practice and conducting extra classes.</td></tr>
<tr><td colspan="4">PO6: Understand the global, societal context of Engineering.</td></tr>
<tr><td>PO6</td><td>1.41</td><td>0.57</td><td>Attainment can be improved in the following subjects.</td></tr>
</table>

			10AL51, 10ME71, 10ME81 **Observations :** 1. Lateral entry Students are not exposed to basic of engineering mathematics 2. Students find it difficult to solve the engineering problems 3. Basic knowledge of design is not well understood 4. Subject involves both analysis and design **5.** Solving design problems found to be lengthy
Actions 1. Additional classes to be conducted to teach management based subjects. 2. Practical approach of teaching method should be adapted.			
PO7: **Provide Mechanical Engineering Solutions to green and sustainable development.**			
PO7	**2.167**	**0.469**	Attainment can be improved in the following subjects 10ME55,10ME661,10ME761,10ME754 **Observations :** 1. Lateral entry Students are not exposed to basics. 2. Students find it difficult to solve the engineering problems 3. Basic knowledge of design is not well understood 4. Subject involves both analysis and design **5.** Solving design problems found to be lengthy
Actions 1. Additional classes to be conducted to introduce 2. More examples on the subject to be practiced by students in extra classes 3. More problems will be given for practice/Assignments.			
PO8: **Demonstrate Knowledge of Professional and Ethical Responsibilities.**			
PO8	**1.10**	**0.64**	Attainment can be improved in the following subjects 10AL51, 10ME833 **Observations :** 1. Lateral entry Students are not exposed to basic of engineering. 2. Students find it difficult to solve the engineering problems

			3. Basic knowledge of design is not well understood 4. Subject involves both analysis and design **5.** Solving design problems found to be lengthy
Actions 1. Additional classes to be conducted to introduce 2. More examples on the subject to be practiced by students in extra classes 3. More problems will be given for practice			
PO9: **Work with Others to accomplish common goals.**			
PO9	**1.58**	**0.27**	Attainment can be improved in the following subjects: 10ME86 **Observations :** 1. Students are not showing interest in Real time projects. 2. Students find it difficult to solve the engineering problems. 3. Basic knowledge of design is not well understood.
Actions 1. Additional classes to be conducted to motivate students to do projects. 2. Students should be sent to Industries to do project. 3. Students should be sent to other colleges/universities to contact higher resource persons. 4. Students should be sent to nearby testing centers to conduct any tests/experiments.			
PO10: **Communicate Effectively in both verbal and written form.**			
PO10	**1.33**	**0.71**	Attainment can be improved in **Observations :** 1. Solving design problems found to be lengthy.
Actions: 1. More problems will be given for practice			
PO11: **Developing Confidence for self-education and ability for lifelong Learning.**			
PO11	**1.43**	**0.65**	Attainment can be improved in **Observations :** 1. Solving problems found to be lengthy
Actions: 1. More problems will be given for practice			

PO12: **Complete a Project with Financial Management.**			
PO12	**2**	**0.27**	Attainment can be improved in the following subjects **Observations :** 1 Students find difficult to understand concepts 2. Subject involves both analysis and design which confuses students.
Actions: 1. More examples on design to be practiced by students in extra classes 2. Practical approach of teaching to be adapted.			

PSOs Attainment levels & actions for improvement (2015-16) CAY

<table>
<tr><th>PSOs</th><th>Target level</th><th>Attainment level</th><th>Observations</th></tr>
<tr><td colspan="4">PSO1:student will able to use techniques, skills and modern engineering tools for civil engineering day to day practice</td></tr>
<tr><td>PSO1</td><td>2.05</td><td>1.87</td><td>Attainment is low in the few subjects.

Observations :
1. Lateral entry Students are not exposed to basic of engineering mathematics
2. Students find it difficult to solve the engineering problems
3. Basic knowledge of design is not well understood
4. Subject involves both analysis and design
5. Solving design problems found to be lengthy</td></tr>
<tr><td colspan="4">Actions
1. Additional classes to be conducted to introduce design subjects
2. Practical approach of teaching design to be adapted.
3. More problems will be given for practice</td></tr>
<tr><td colspan="4">PSO2: students will able to participate in critical thinking and problem solving of civil engineering field that require analytical and design knowledge</td></tr>
<tr><td>PSO2</td><td>2.87</td><td>1.86</td><td>Attainment is low in the few subjects.

Observations :
1. Lateral entry Students are not exposed to basic of engineering mathematics
2. Students find it difficult to solve the engineering problems
3. Basic knowledge of design is not well understood
4. Subject involves both analysis and design
5. Solving design problems found to be lengthy</td></tr>
</table>

Actions 1. Additional classes to be conducted to introduce design subjects 2. Practical approach of teaching design to be adapted. 3. More problems will be given for practice			
PSO3: students will able to persue of life long learning and professional development to face the challenging emerging needs of our society			
		Attainment is low in the following subjects **Observations :** 1. Lateral entry Students are not exposed to basic of engineering mathematics 2. Students find it difficult to solve the engineering problems 3. Basic knowledge of design is not well understood 4. Subject involves both analysis and design 5. Solving design problems found to be lengthy	
Actions 1. Additional classes to be conducted to introduce design subjects 2. Practical approach of teaching design to be adapted. 3. More problems will be given for practice			

7.2. Academic Audit and actions taken thereof during the period of Assessment (10)

(Academic Audit system/process and its implementation in relation to Continuous Improvement)

The Following audit agencies are visiting and conducting audit annually and giving their feedback:

1. AICTE (All India Council for Technical Education)
2. DTE
3. LIC
4. Management Committee
5. Academic review by principal after each internal assessment test thrice a semester
6. Review of research committee, Industry interaction Committee
7. Stock verification/validation Committee
8. ISO COMMITTEE.

The Recommendations /suggestions are being implemented.

Improvement in the quality of students admitted to the program

Item		CAY (2015-2016)	CAYm1 (2014-2015)	CAYm2 (2013-2014)
Nation Level Entrance Examination (COMED K)	No. of students admitted	01	02	02
	Opening score /Rank	37969	28138	33157
	Closing score /Rank	-	37993	38471
State level entrance examination (**CET)**	No. of students admitted	33	37	35
	Opening score /Rank	57510	53001	65226
	Closing score /Rank	123599	60555	110096
SNQ (Supernumerary Quota)	No. of students admitted	03	03	02
	Opening score /Rank	29968	41070	40235
	Closing score /Rank	56688	53405	41378
Management	No. of students admitted	10	12	07
DTE entrance Examination for lateral entry or lateral entry details	No. of students admitted	18	11	19
	Opening score /Rank	11900	8772	8069
	Closing score /Rank	19760	17649	15877
Management	No. of students admitted	06	02	-