

SDM College of Engineering and Technology, Dhavalagiri, Dharwad-5800

Department of Chemical Engineering

STRATEGIC PLAN IMPLEMENTATION REPORT



Report for the Year 2022

Date :24-01-2023

Yearly Implementation

Reference: 5 Year Plan 2022-2026

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INTRODUCTION:

The purpose of this document is to record the **yearly** progress of the Department based on the stated strategic plan for the year -2022 (starting from 1st January and ending by 31st December). In charge person indicted against each perspective/ Key areas have participated in the audit process and the records maintained by them are seen thoroughly by the audit team.

AUDIT TEAM:

1. Chairman: Principal, SDMCET, Dharwad
2. Members:
 - a) Dean Academic Program
 - b) Dean R & D
 - c) IQAC Coordinator— Member Secretary

INSTITUTIONAL VISION AND MISSION:

VISION:

To develop competent professionals with human values.

MISSION:

- M1. To have contextually relevant Curricula.
- M2. To promote effective Teaching Learning Practices supported by Modern Educational Tools and Techniques.
- M3. To enhance Research Culture.
- M4. To involve the Industrial Expertise for connecting Classroom contents to real-life situations.
- M5. To inculcate Ethics and soft-skills leading to overall personality development.

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ADDITIONAL FOCUS:

- F1: Curriculum relevance- **M1**
- F2: Academic/ Exam results- **M1, M2, M4**
- F3: Research papers, Sponsored Projects, Root cause analysis for rejected papers and filling gap.-**M3**
- F4: Value additions: Teaching, Soft skills, Use of ICT / Presentation, Discussion Groups (Communication skills)- **M2 & M5**
- F5: Community oriented services- **M3 & M5**
- F6: Placement.
- F7: Accreditation and Ranking: NBA, NAAC and NIRF -**M1 to M5 & Establishment of strong IQAC to support quality checks and Institutional repository.**
- F8: National Educational Policy- NEP-2020 – **M1 to M5.(Experiential Learning)**

CONTACT DETAILS:

1. Dr. Shivanand Y.A, Chemical Engineering, SDM College of Engineering and Technology, Dharwad-580002.

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2. Dr. Keshava Joshi/Dr. Lokeshwari N, Department of Chemical Engineering, SDM College of Engineering and Technology, Dharwad-580002.

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Mobile: 9980998266/9663398152

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Year 2022					
Focus [1]	Perspective/ Key Areas [2]	PLANNING [3]	Observations / Remarks by Auditors		
			Outcomes achieved [4]	Reasons for any deviation [5]	Further action plan, if applicable [6]
F1 / M1 Curriculum Relevance	Re-establishing the relevance of critical thinking in Course outcomes and raising learning levels focusing on Experiential learning of NEP-2020.	Activity-I: BOS meet Outcome/Target: <Quantifiable outcomes/targets> 1. Reframing of COs 2. NEP implementation as multidisplinary activities In-charge Faculty: Dr. Keshava Joshi Prof. H.S. Ashoka	1. BOS meet was conducted on 8 th Aug 2022. Pg 13-20 2. BOS report in full format is maintained and documented. Only the few extra of that is being attached here with the report 3. The highlights of the BOS were ✓ Introduction of open electives as multidisplinary activities of NEP. ✓ The CO of the Pollution Control Engineering (18UCHC403) has been reframed to enhance the interpretation and design and development waste water treatment plants. ✓ The CO of the Environmental Engg.lab has been reframed as the experiments have been enhanced.		
	Re-establishing the relevance of Program Articulation Matrix-PAM	Activity-I: BOS meet Outcome/Target: <Quantifiable outcomes/targets> 1. Implementation of mapping of CO-PO for the modified COs In-charge Faculty: Dr. Keshava Joshi Prof. H.S. Ashoka	1. Implementation of CO-PO mapping for the modified COs was discussed in Pre-BOS conducted on 1 st Aug 2022. It is verified and quantified by the Department IQAC 2. The PAM matrix for the Batch 18 scheme (3 rd to 8 th semester) is documented 3. The PAM matrix for the Batch 21 scheme is documented only till 4 th Semester.		
	Conducting internal and External Audits	Activity-I: Internal Audit Outcome/Target: <Quantifiable outcomes/targets> 1. Verifying the last year outcomes and progress In-charge Faculty: Dr. Shivanand Y.A Dr. Keshava Joshi	1. Both Internal and External Audit are completed and documented 2. Internal Audit was conducted on 15/07/2022 by Department IQAC team. Verified and quantified by the IQAC and HOD Pg 21-25 3. External Audit was conducted on 21/07/2022 by and expert panel Dr. C.M. Kalleshappa, HOD-Chemical Engineering, BIET Davangere. The extract of his remarks are attached here with. Pg 26-29 ✓ He has appreciated the way it was presented. ✓ He verified and quantified the details presented. ✓ He appreciated for the reserch work carried out and the students participation outside.		
Others- if any					

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Focus (1)	Perspective/ Key Areas (2)	Year 2022		
		PLANNING (3)	Observations / Remarks by Auditors	
			Outcomes achieved (4)	Reasons for any deviation (5)
F2 M1,M2,M4 Exam Results	Bridge Courses For all and specific to Slow learners & Learning Extensions	Activity-1: Slow learners classes for below the set target Outcome/Target: <Quantifiable outcomes/targets> 1. The classes conducted report and the change in observation improved In-charge Faculty: Dr. Lokeshwari N/ Dr. Rashmi S H	Pg 32 (Sample CP) 1. The slow learners are identified in the courses especially the problematic subjects who have scored below the set target (below 10 marks/out of 20 in the 1 st test) as per the DUGC. 2. The classes were conducted for identified slow learners in Subjects like Fluid Mechanics, Particulate Technology, Heat Transfer, Chemical Reaction Engineering, Process Integration, Chemical Equipment Design, Mass Transfer. 3. The conduction of the classes and improvement observed are maintained with respective course instructors in the register. The same is verified and quantified by Department IQAC. 4. Few sample extracts have been attached here with the report.	
	Tutorials for complex courses	Activity-1: Identification of the courses for Tutorial classes and its implementation Outcome/Target: <Quantifiable outcomes/targets> 1. Time table framed 2. Classes conducted report In-charge Faculty: Dr. Lokeshwari N/ Dr. Rashmi S H	Pg 33 (Tutorial Time Table) 1. The courses are identified in the pre-BOS held on 1 st August 2022 for conducting tutorial classes based on the problematic subjects 2. Time table is implemented for conducting tutorial classes by mentioning the scheme of the tutorial for the identified course in that semester. 3. The tutorial classes were conducted for subjects identified in the curriculum for tutorial classes as per the scheme designed in the BOS. 4. Course instructor register is verified and quantified by Department IQAC for the same. Pg 34 (PO attainment improvement for Results)	

	Strengthening Experimental Learning component	Activity-1: An course will be enhanced Outcome/Target: <Quantifiable outcomes/targets> 1. Two experiments included in the curriculum 2. List of the experiments In-charge Faculty: Dr. Lokeshwari N/ Dr. Rashmi S H	1. Atomic absorption spectrophotometer is purchased under the VGST project. 2. Bernoulli's experimental setup in Fluid Mechanics Lab. Pg 30 (List of expts) 3. Other Equipment setups procured are, in which the modifications of existing ones has been done.	
	Industry Connectivity for Class room	Activity-1: Conduct of Industrial visits and expert talks Outcome/Target: <Quantifiable outcomes/targets> 1. Two Visits 2. Two Talks 3. Report of the talk conducted and its feed back In-charge Faculty: Prof. S. S. Inamdar	Number of Industrial visits conducted: 03 Pg 35, 36, 37 1. The 7 th semester students of Chemical Engineering visited Sugar Industry at Munvalli on 3 rd March 2022. Prof Ashoka accompanied the students. The interaction was good and students learnt different unit operations of sugar industry. 2. The 7 th semester students of Chemical Engineering visited Aditya Birla, Karwar on 8 th Nov 2022. Prof Kiran Rathod accompanied the students. 3. The 5 th semester students of Chemical Engineering accompanied by Dr. Keshava Joshi visited Epsilon carbon, Torangal on 3 rd Dec 2022. Students had a good interaction with industry expert and understood the process of coal processing and different unit operations. They have rated 5/5 on the scale. Number of Expert talks arranged: 02 Pg 38. 1. Department of Chemical Engineering had conducted the Seminar on Climate change on 6 th June 2022 on account of the world environment day. 2. Shilpa Medicare industry talk in June 2022	
	Others- if any			

		Year 2022			
Focus [1]	Perspective/ Key Areas [2]	PLANNING [3]	Observations / Remarks by Auditors		
			Outcomes achieved [4]	Reasons for any deviation [5]	Further action plan, if applicable [6]
F3 M3 Research	Quality assessment of all research proposals	Activity-1: Research Faculty committee will be formed to check the quality of the submissions Outcome/Target: <Quantifiable outcomes/targets> 1. Quality of Research proposal submission 2. Quality of Paper submissions In-charge Faculty: Prof. H.S. Ashoka/ Prof. Kiran rathod	1. The Research Committee is formed. Dr. Keshava Joshi is member		
	IPR: Copyrights and Patents Paper Publications Funded Projects	Activity-1: ReserchFaculty committee will be formed to check copyright, patent, paper submissions Outcome/Target: <Quantifiable outcomes/targets> 1. Paper submission:01 2. Proposal submission:01 In-charge Faculty:	Number of paper publications: 03 (Proposed: 02) Pg 39-46 1. Lokeshwari. Navalgund, Keshava Joshi, Umesh Deshanna var , Vinayaka B. Shet, Sampath Emani, Gurunadh Velidi. Studies on removal of RBB and Safranin-O dyes from aqueous solution using concentrated acid treated red mud (CATRM) as adsorbent. Review of Adhesion and Adhesives. Vol. 10 No. 4 (2022). Q3 and Scopus. 2. Prashant B. Dehankar, Keshava Joshi, Vijay A. Bhosale, Kalyan I. Patil. Investigation of newly designed Alternate Perforated V-Notch (APVN) twisted tape with heat transfer characteristics. Results in Engineering 14 (2022). Q1. Scopus. https://doi.org/10.1016/j.rineng.2022.100425 3. Prashant B. Dehankar, Keshava Joshi, Vijay A. Bhosale and Rishikesh N. Mulik. Assessment of twist tape thermal performance in heat transfer passive augmentation technique. Beni-Suef University Journal of Basic and Applied Sciences. (2022) Q3, Scopus. 11:29 https://doi.org/10.1186/s43088-022-00208-0		

	Prof. H.S. Ashoka/ Prof. Kiran rathod	Number of Book Chapter submission: 03 1. Vinayaka B. Shet, Keshava Joshi, Lokeshwari Navalgund, Ujwal Puttur. Biosynthesis of Nanoparticles Using Agriculture and Horticulture Waste. Wiley Publication. Biotechnology for Zero Waste: Emerging Waste Management Techniques. Book Editor(s): Chaudhery Mustansar Hussain, Ravi Kumar Kadeppegari Jan 2022. https://doi.org/10.1002/9783527832064.ch24 2. Keshava Joshi, Lokeshwari Navalgund, and Vinayaka B. Shet (2021). Water Pollution from Construction Industry: An Introduction. Pg:245-257. Springer Nature Switzerland AG 2022 J. A. Malik and S. Marathe (eds.), Ecological and Health Effects of Building Materials, https://doi.org/10.1007/978-3-030-76073-1_13 3. Vinayaka B. Shet, Lokeshwari Navalgund, Keshava Joshi, and Silvia Yumnam (2021). Application of Nanoparticles in Construction Industries and Their Toxicity. Pg. 147-157. Springer Nature Switzerland AG 2022 J. A. Malik and S. Marathe (eds.), Ecological and Health Effects of Building Materials, https://doi.org/10.1007/978-3-030-76073-1_9
		Number of Project proposals submitted : 06 Pg 47 Details of the list is enclosed Number of Project sanctioned: 01 (Proposed: 01) Pg 48
Others- if any		Number of International Conferences attended by faculty: 02 Pg 49 Number of Best paper awards in International Conferences: 02 Pg 50-52 Number of FDP/Trainings attended by faculty: 04 Number of Students funded projects: 02 KSCST; 02 VTU Number of Students prizes for paper presentation: 05 Student best business plan award by Manthan: 01 Pg 52 Pg 53, 54 (Faculty performance for 2022)

YCE 2022					
Focus	Perspective/ Key Areas	PLANNING	Observations / Remarks by Auditors		
			Outcomes achieved [4]	Reasons for any deviation [5]	Further action plan, if applicable [6]
F4 M2 & M5 Value additions	Learning for Placement	Activity-1: Training activities Outcome/Target: -Quantifiable outcomes/targets-> 1. Two trainings for students In-charge Faculty: Dr. Keshava Joshi/ Prof. Kiran Rathod	No of trainings conducted: 05 (Proposed: 02) The list and details in the form of booklet are maintained in the department. The list is enclosed here with report. Verified by Department IQAC		pg 55 - list pg 56 - 58 all profs.
	Soft Skills	Activity-1: Included in curriculum for 1 credit course Outcome/Target: -Quantifiable outcomes/targets-> 1. Training will be conducted 2. Test will be conducted In-charge Faculty: Dr. Keshava Joshi/ Prof. Kiran Rathod	Training for soft skill was conducted by college and test was conducted to evaluate for the 1 credit on 16 th -18 th Dec 2022		Detail with C-III
	Discussion Group	Activity-1: Training on Group discussion Outcome/Target: -Quantifiable outcomes/targets-> 1. GD will be arranged by alumni In-charge Faculty: Dr. Keshava Joshi/ Prof. Kiran Rathod	GD was conducted for the pre final year students through soft skill training conducted from 16 th -18 th Dec 2022		Detail with C-III

Year 2022					
Focus	Perspective	Perspective/ Key Areas	Observations / Remarks by Auditors		
			Outcomes achieved [4]	Reasons for any deviation [5]	Further action plan, if applicable [6]
Others		< Activity/ Outcomes/Targets and Faculty I/C to be mentioned here >			
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		< Activity/ Outcomes/Targets and Faculty I/C to be mentioned here >			
		< Activity/ Outcomes/Targets and Faculty I/C to be mentioned here >			

Year 2022					
Focus	Perspective	Perspective/ Key Areas	Observations / Remarks by Auditors		
			Outcomes achieved (4)	Reasons for any deviation (5)	Further action plan, if applicable (6)
F7 Accreditation and Ranking	NBA Faculty I/C: NBA Coordinator	Activity-1: NBA preparedness Outcome/Target: <Quantifiable outcomes/targets> 1. Document and data verification for submission In-charge Faculty: Dr. Keshava Joshi/ Dr. Lokeshwari N	Not eligible for applying for NBA		
	NAAC Faculty I/C: NAAC Coordinator	Activity-1: NAAC preparedness Outcome/Target: <Quantifiable outcomes/targets> 1. Document and Data collection for submission In-charge Faculty: Dr. Rashmi S H	Submitted all the data for NAAC		
	NIRF ranking. Faculty I/C: PG Coordinator	Activity-1: Outcome/Target: <Quantifiable outcomes/targets> 1. Documents and data collection for submission In-charge Faculty: Prof. Inamdar	-		
	Others- if any				

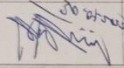
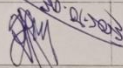
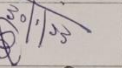
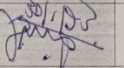


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Year 2022					
Focus	Perspective/ Key Areas	PLANNING	Observations / Remarks by Auditors		
			Outcomes achieved (4)	Reasons for any deviation (5)	Further action plan, if applicable (6)
F6 Placement	No. of Offers	25	25 offers from the department. The list is enclosed here with		
	No. of students getting Placed	17	17 students are placed with good package and in the core sectors		
	pay packages being offered	4 Lakh	The avregage package of the 2022 year is 4 Lakh		
	MoUs	01	One MoU with nochrome group Pvt. Ltd., Dharwad. Two Trainings are conducted every year. Studnets are involved in doing projects and getting the samples analysed.		
	Internship	32	The list of the internship completed by the student in 2022 is enclosed for the refernces.		
	Others- if any				

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Focus	Perspective/ Key Areas	PLANNING	Observations / Remarks by Auditors		
			Outcomes achieved [5]	Reasons for any deviation [5]	Further action plan, if applicable [6]
F5 Community Oriented Services M3 & M5	Awareness Program	Activity-1: Awareness Program Outcome/Target: <Quantifiable outcomes/targets> 1. One visit will be conducted to bring awareness In-charge Faculty: Prof. Kiran Rathod			
	Learning Programs through workshops	Activity-1: Learning program for school children in science and maths Outcome/Target: <Quantifiable outcomes/targets> 1. In-charge Faculty: Prof. Kiran Rathod	Visited Yerikoppa village, and engaged classes for 8 th , 9 th , and 10 th standard students and educated on mathematics short tricks, basic English grammar and also provided the information on scholarship opportunity after 10 th standard on 18/11/22		
	Technology Transfer Programs	Activity-1: Handling and managing solid waste at Villages Outcome/Target: <Quantifiable outcomes/targets> 1. In-charge Faculty: Prof. Kiran Rathod	Visited Yerikoppa village, and engaged classes for 8 th , 9 th , and 10 th standard students and educated on how to manage solid waste in village. Also asked villagers how the waste to be segregated, the pits to be done for composting, how the segregation helps in generating the money and the reuse and recycle cocnepts on 18/11/22		
	Others- if any				

English Communication Skills	communication Outcome/Target: <Quantifiable outcomes/targets> 1. One training will be arranged by English Professor through department In-charge Faculty: Dr. Keshava Joshi/ Prof. Kiran Rathod	English communication was covered in softskill training conducted by the college from 16 th - 18 th Dec 2022 <i>Details: M C-III</i>
Use of ICT Information Communication Technology	Activity-1: Outcome/Target: <Quantifiable outcomes/targets> 1. In-charge Faculty: Dr. Keshava Joshi/ Prof. Kiran Rathod	
Others- if any		

Quarter	Secretary Member DACC	Coordinator IOAC	Strategic Plan of Faculty IC	Department Head of the	Audit Team Member-3	Audit Team Member-2	Audit Team Member-1	PRINCIPAL
7					—	—		

Name and Signature with Date of the concerned authority

The auditing team and approved by the concerned authorities mentioned below.

The progress report mentioned above is presented by the concerned department team, verified for its correctness by

Remarks - by the auditing team:

STRATEGIC PLAN REVIEW

2022

BY

IQAC SDMCET, DHARWAD

ON

24-01-2023 @ 2.30pm

Department of Chemical Engineering

F1 → Rewriting the implementation details.
Structural alignment is needed

Rewriting the implementation details of strengths of
Lab's.

Write in the details of the event conducted

C-III needs to be taken for any
trainings conducted.

Course series not fully attained.

Not eligible for NBA. Matter of concern to
be updated quickly.

SDM College of Engineering & Technology, Dharwad – 580002
Department of Chemical Engineering
Minutes of 16th BOS meeting (2022-23) held on 8th August 2022

Program: UG Chemical Engineering

Meeting of Board of Studies of Chemical Engineering was held on 8th August 2022 from 10.00 A.M. to 2.00 P. M. in the Dept. of Chemical Engineering to discuss and finalize scheme & syllabus of B.E. Chemical Engineering Program for the academic year 2022-23.

Agenda

1. Complete Scheme and Syllabus revision for III and IV Semester according to 160 credits scheme of NEP 2021.
2. Syllabus revision / updation up to 10% change in the current curriculum for V, VI, VII and VIII Semester according to 175 credits of 18 Scheme.
3. Revised CO –PO mapping

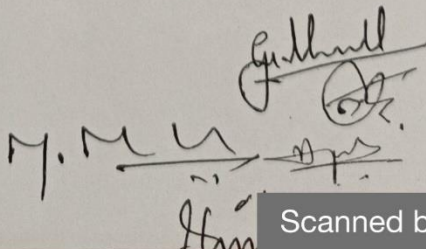
Chairman of the B.O.S. – UG-Chemical, Dr. Shivanand Y.A. welcomed all the BOS members and briefed the committee about the changes to be made in UG scheme and curriculum to align with AICTE, VTU, Belagavi and SDMCET guidelines.

Chairman introduced all the external members to the Dean Academic. Dean Academic briefly explained about the scheme and structure of the academic year 2022-23.

Then, Chairman briefed about the pre BOS meet held on 3rd August 2022. Each agenda of the 16th BOS meet was discussed deliberately by all BOS members.

Agenda 1: Complete Scheme and Syllabus revision for III and IV Semester according to 160 credits scheme of NEP 2021. The following suggestions were made by the members

- AEE can be offered at Institutional Level –Suggested by Dr.G.M. Madhu
- Title of the AEE course was reframed as (Principles in Chemical Engineering-I)- Suggested by Dr. G.P. Desai
- CO2 to be modified in process calculation - Suggested by Dr.G.M. Madhu
- In Process calculation, the cubic equations can be deleted as it is a repetition in thermodynamics- Suggested by Dr.G.M. Madhu



 G.M. Madhu

 G.P. Desai

- Contents of CO5 can be modified as material balance reaction already includes combustion topic in process calculations- Suggested by Dr.G.M. Madhu
- CAD software can be used to teach chemical engineering drawing- Suggested by Dr. Muddu Madakyaru
- Book authored by D.Q Kern can be included in Process Heat Transfer Suggested by Dr. Muddu Madakyaru

The scheme and syllabus of the 2nd and 3rd Year was approved by the BOS members

Agenda 2: Syllabus revision / updation up to 10% change in the current curriculum for V, VI, VII and VIII Semester according to 175 credits of 18 Scheme. The following suggestions were made by the members

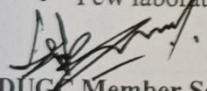
The scheme and syllabus of 3rd and 4th Year was approved by BOS members.

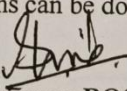
Agenda 3: Revised CO-PO mapping

CO-PO mapping was approved.

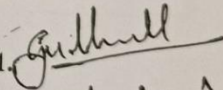
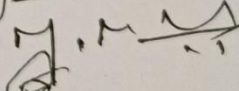

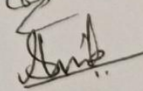
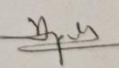
General comments were opined by external members on the above-mentioned agendas held on 8th August 2022

- GATE courses to be given more emphasis under NEP 2020
- Some of the core courses Tutorials classes can be included with L-T-P- 2-2-0
- Atleast two courses per semester to have tutorial classes.
- Syllabus content of Mathematics course can be branch specific.
- All four years can be included with Internship course as specified by VTU
- Elective courses in the higher semester can be grouped as stream specific.
- JMP software can be procured at Institutional level common for all branches.
- Few laboratories experimental calculations can be done using excel sheet.


DUGC Member Secretary
Members

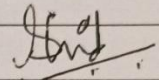
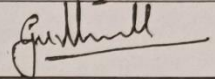

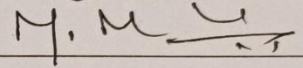
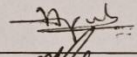
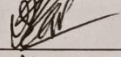
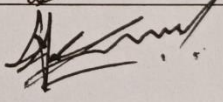

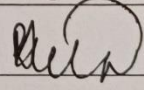



Chairman BOS

External

1. 
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3. 
4. 
5. 

Chairman, Dr. Shivanand Y.A thanked all the members for their valuable inputs and suitable corrections in scheme and curriculum. The approved scheme and syllabus are attached here with.

Following members were present in the meeting.

Sl. No.	Particulars	Name of Experts	Signature of the Members
1	Chairman	Dr. Shivanand Y. A	
2	VTU Nominee	Dr. G.M. Madhu	
3	Subject Experts	Dr. G. P. Desai	
		Dr. Muddu Madakyaru	
4	Industry / Corporate sector representative	Mr. Vinay Konaje	
	Alumnus	Mr. Vivek Patil	
5	Faculty members	1) Prof. S.S. Inamdar	
		2) Prof. H.S. Ashoka	
		3) Dr. Lokeshwari N	
		4) Dr. Rashmi S.H.	
		5) Prof. Kiran Kumar Rathod	
8	Member Secretary	Dr. Keshava Joshi	

Place: Dharwad

Date: 8th August 2022

Curriculum updated in 2022-23

The following are updated and incorporated in the syllabus of 2022-23

- Implementation of 21 scheme for the 2nd year.
- Introduction of Ability Enhancement course, Universal human values, CIPE
- New subject COs are framed and mapped with POs.
- COs of Pollution control Engineering in 4th semester have been modified.
- Case studies as separate unit in Pollution control Engineering has been removed and clubbed in the other units.
- Fluid Mechanics from 4th semester has been shifted to 3rd semester.
- Heat Transfer and Environmental Engineering Labs from 5th semester have been shifted to 4th semester.
- Few experiments are added to the Environmental Engineering Lab and accordingly the COs are modified

Curriculum updated in 2021-22

The following are updated and incorporated in the syllabus of 2021-22

- Implementation of 175 credits for the 4th year
- Open elective was introduced in 4th year for 7th and 8th semester (Biochemical Engg., Instrumental analysis and Nanotechnology. Solid waste management, Green Technology, Environmental Impact assessment)
- Introduction of Internship course in 7th semester.
- New subject COs and POs are framed and mapped.

Department of Chemical Engineering-SDMCET
ACADEMIC AUDIT REPORT for 2020-21- Internal

Audit Team Details

Date of Audit: 17/05/22

Name of the Department: Chemical Engineering				Name of the Institution: SDMCET, Dharwad			
Sl. No	Name	Affiliation	Designation	Mobile No	Email Id	Role in Audit Team	Signature with date
1	Shivanand Patil	SDMCET- Dwd	HOD	7853963888	shivudagarti@gmail.com	Chairman	[Signature] 17/5/22
2	S.S. Meenadar	SDMCET, Dharwad	Asst Prof.	7481705272	raaj_chem@rediffmail.com	IQAC-Dept	[Signature] 17/05/22
3	Ashoka H.S	SDMCET, Dharwad	Asst. Prof.	9009153780	reshat.hobanaraj@gmail.com	DUGC-member Secretary	[Signature] 17/5/22
A.	Keshav Joshi	SDMCET	Asst Prof	9920992166	Joshibkshwaa@gmail.com	Bos Member Secretary	[Signature] 17/5/2022

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Sl. No	Audit Parameters	Observations and Suggestions
1.	Implementation of strategic plan for this academic year w.r.t Vision and Mission defined. [Based on 5 year plan approved by AC/GC]	<p>The proposed strategic plan has been implemented for the academic year 2020-21. Vision and Mission of the program. All the details of the conduct of even implementation are verified through documents provided at department through following missions of the program.</p> <p>M1- Curricula in tune with Industry- Electives like, Petroleum, Polymers, Drug and Pharma Engineering, Air and water engineering are offered for students. Industry internship is mandatory course introduced in new curricula.</p> <p>M2- Research up-gradation- Funded project of 60 Lakh (Ongoing), 02 Int. Journal Papers Published, 04 Conference papers.</p> <p>M3-Industry connectivity- MoU with Nichrome, Visiting faculty- Lectures, Industry Interaction:02. The DUGC and BOS proceedings are verified along with syllabus copy.</p>
2.	Curriculum revision/status to meet current industry/market needs. [Based on the mission- M1- To Have contextually relevant Curricula]	<ul style="list-style-type: none"> The following points mentioned are revised in the current year syllabus in 2020-21 to meet the current industry and market needs. ✓ The model curriculum of AICTE for 175 credits is introduced to 7th and 8th Semester ✓ New electives like Drug and Pharma, Food Engineering, Nuclear Engineering are introduced to meet the need of industry and market. ✓ Few new electives like Green technology, air pollution control engineering and advance waste water treatment are introduced which is the need of the today market to keep the surrounding environment clean. ✓ Curriculum has introduced more project credits to have much involvement of students in understanding the basics and work in team with project and financial management. ✓ Internship is made mandatory course
3.	Implementation of OBE principles:	<ul style="list-style-type: none"> In 2020-21, the OBE system is practised with implementation of action plans completed in 2019-20 IQAC proceedings of 2020-21 are verified with action plan.

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		<ul style="list-style-type: none"> All the course files of the course teacher are verified and signed by IQAC coordinator. The target of the attainment is increased from 50 to in the range of 55 to 60 in different courses. Multilevel mapping is modified for few courses to justify the mapping Batch attainment has been improving consistently. Increase in number of placements and performance of students with good percentage, good success index and API index have shown the reflection attaining the program outcomes.
4.	Quality of Course plan, Question papers in terms of its compliance to Course outcomes. - Individual	<ul style="list-style-type: none"> The lesson plan of all the subjects is being prepared by all the course instructors and based on the previous attainment, action plans are mentioned. All the question papers both internal and external are in compliance of the COs. IQAC and BOE proceedings are verified for the QP quality and blooms taxonomy and in terms of its compliance to COs.
5.	Results and Outcome attainment including action plan. – Individual / common [Its effective implementation]	<p>The performance through the results, attainment and its implementation are observed.</p> <ul style="list-style-type: none"> Department has computed the pass percentage of every semester in 2020-21 and observed that the performance is improved from the last year. The success index with and without backlogs is 1 and 0.315 respectively. The API index of 2020-21 is 8.18 Individual course files of 2020-21 are verified with proper contents and attainment with action plan. The batch attainment of 2020-21 is completed.
6.	Best Practices.	<p>Best practices at the department</p> <ul style="list-style-type: none"> Alumni and industry person interaction Career guidance's for higher studies/Internships Community services Industrial visits Students sponsored projects

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		<p>Proof of conduct and documents are verified</p> <ul style="list-style-type: none"> Alumni interactions-01 Career guidance-01 Community services-00 Industrial visits-00 KSCST, IICHe, VTU student funded project-04
7.	Quality of Computing Infrastructure and other equipment in the laboratory to fulfil the needs of technological growth and trends and its utilization.	<p>It has been observed that, the budget sanctioned has been utilized in procuring new technological growth and its utilization. The documents are verified for the same.</p>
8.	Research, Consultancy and IPR	<p>Proposed in 2020-21 strategic plan</p> <ul style="list-style-type: none"> Funded project-01 Research scholar-01 Publication-04 Doctorates: 70% <p>Proof of conduct and documents are verified</p> <ul style="list-style-type: none"> No of ongoing projects: 03 (VGST sanctioned letters observed) Research scholar details-04 ongoing PhDs (Registration details of VTU) Publications:02 (First page of paper published) Consultancy is initiated in the department by visiting the different nearby industries. The testing is being carried out by the department. Suggested to visit all industry and make an attempt in having consultancy work being carried out. No any IPR program conducted. Suggested to attend any IPR related activities. No of faculty funded projects submitted: 04

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9.	Industry Connectivity MOUs	<p>Proposed in 2020-21 strategic plan</p> <ul style="list-style-type: none">• Guest lecturers: 04• Industry projects: 02• Internships: 10• Industry visits: 03• Industrial Training: 04• Adjunct faculty: 01 <p>Proof of conduct and documents are verified</p> <ul style="list-style-type: none">• Number of Guest lecturers conducted: 01• Student funded Industry based project by KSCST, IICChE, VTU: 04• Number of Industry internships: 19• Number of Industrial visits: 00• Number of Industrial visits for placement: 00• No of placements in 2020-21: 13/19• Number of Industrial Training conducted: 00• MoU with Nichrome industry for five years• Training with Nichrome Industry: 00
10.	Others	<ul style="list-style-type: none">• Faculty and students have participated in various programs during the Covid 19 period and won the awards.• Students have under gone NPTEL courses• IICHE Students chapter is applied under Bangalore Regional Chapter in 2019-20 and is approved• Four project proposals have been submitted by the department for different agencies like DST, ATAL-FDP and VGST.• Faculty have participated in International and National conferences and presented the papers and also participated in different courses.

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ACADEMIC AUDIT REPORT- External

Name of the Department : <u>Chemical Engineering</u>	Date of Audit: <u>21.7.2022</u>
	Name of the Institution <u>SDMCET, Dharwad</u>

AUDIT TEAM DETAILS

Sl. No	Name	Affiliation	Designation	Mobile No.	Email Id	Role in Audit Team	Signature with date
1	<u>Dr. C.M. Kallechappa</u>	<u>BIET</u>	<u>Prof & Head</u>	<u>9449202199</u>	<u>Chari Kallech @gmail.com</u>	<u>Chairperson - Internal</u>	<u>[Signature]</u> <u>21.7.2022</u>
2							
3							
4							

Overall Observation/Remarks:

Faculty are highly qualified. Faculty research and publications are satisfactory. Student pass percentage and placement is good. Implementation of strategic plan is satisfactory. Needs improvement in industrial interactions and publications.

[Signature]

21.7.2022.

Dr C M Kallechappa
Prof & Head, Dept of Chemical Engg
BIET, Davangere 4

No	Audit Parameter	Observations and Suggestions
1	Strategic Plan: How well the strategic plan or its equivalent any other development plan is executed with clear observable outcomes / evidences?	Development plan is executed with clear outcomes.
2	Mission-1: What level of contextual relevance is brought in the curriculum?	Contextual relevance is brought in the curriculum, however, some relevant electives can be introduced.
	Mission-2: What level of preparedness and implementation is seen in making teaching learning process effective on OBE principles?	Teaching learning process implementation preparedness is satisfactory.
	Mission-3: What levels of establishment of research infrastructure,	Research infrastructure is satisfactory, publications needs to be improved.

	processes and research outcomes are seen?	
5	Mission-4: What level of preparedness and implementation is seen in connecting Industry with class room?	Because of prevailing COVID pandemic there is less connectivity with industry. However, with improving COVID situation this can be improved.
6	Mission-5: What level of preparedness and implementation is seen in developing students' personality focusing on ethics and soft skills?	Soft Skill courses are introduced in the curriculum. However, more soft skill programs may be introduced.
	Other noteworthy achievements? If any.. Faculty members/ Staff/Students	<ul style="list-style-type: none"> ① Sufficient funded projects in the departments. ② Faculty have attended FDPs and STPPs ③ Student project funding and professional body membership and activity is good. ④ Good number of students have

taken up NPTEL courses. Page 3 of 5

8	Suggestions	<p>Student pass percentage is Excellent. Student placement is good. Department has secured grants for carrying out research work. Faculty members are highly qualified and competent. Publications are satisfactory. Strategic plan implementation is satisfied. OBE system is practiced well. IQAC is well coordinating the academic issues.</p> <p><u>Suggestions.</u></p> <p>Industrial visits needs to be improved. Students must be encouraged to take up more number of industrial visits. MOUs and industrial interactions to be boosted further.</p>
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Signature

[Handwritten Signature]

Auditor-1

Dr. C. M. Kalleshappa

21.7.2022

Prof. Head, BIET, Davangere.

Auditor-2

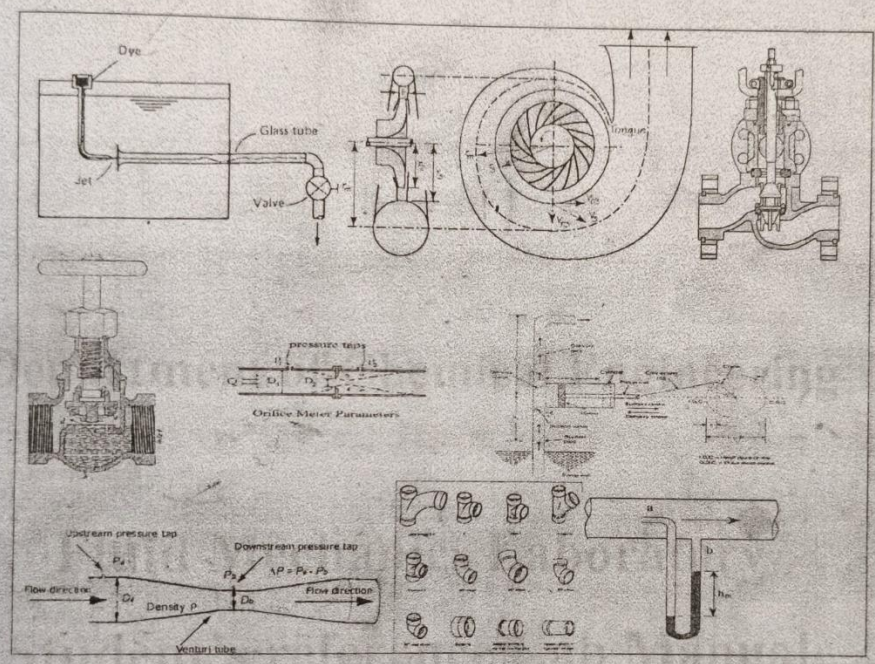
Auditor-3

Auditor-4

[Handwritten mark]

DEPARTMENT OF CHEMICAL ENGINEERING

FLUID MECHANICS LABORATORY MANUAL



Name of the Student :

Semester :

Roll No/USN NO :

Dr. LOKESHWARI N
Course Instructors

SRI. MAHESH. S
Lab Instructor

SDM COLLEGE OF ENGINEERING AND TECHNOLOGY, DHARWAD- 580002
2022-23

Index

Sl. No.	Experiment Name	Page No
1.	Fluidized Bed	5-8
2.	Reynolds Experiment	9-11
3.	Flow Through spiral Coil	12-14
4.	Centrifugal Pump	15-17
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7.	Venturi Meter Characteristics	26-29
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9.	Pitot Tube	34-37
10.	Bernoulli's Apparatus	38-40

STUDENTS' COURSE RECORDS: Continuous Internal Evaluation

NAME	Continuous Internal Evaluation (CIE)						
	IA-I (20)	IA-II (20)	IA-III (20)	CTA (10)	CIE (50)	GRADE	SIGN
4006 SHANISHA HILGA							
4008 KIRAN HALESH							
4011 KUNHAH A RAHADIVE							
4014 ARVINDA GALWOL							
4005 SHILPA BODHEKRI							
<p>portion covered & discussed</p> <p>① Source-link Graphs & Molar approach</p> <p>② Heat integration Graphs & Molar approach</p> <p>③ Total integration Graphs & Molar approach</p> <p>④ Theory of Unit-I & II are covered.</p> <p>⑤ Proposed Plan for course</p>							

STUDENTS' COURSE RE									
Month	1	2	3	4	5	6	7	8	9
Date	2	2	9	9	9	9	9	9	9
Class No.	01	02	03	04	05	06	07	08	09
Sl. No.									
28	1	2	3	4	5	6	7	8	9
29	1	2	3	4	5	6	7	8	9
30	1	2	3	4	5	6	7	8	9
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SDM COLLEGE OF ENGINEERING & TECHNOLOGY, DHARWAD
Department of Chemical Engineering

Academic Year: 2022-23

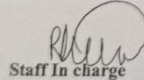
TIME TABLE (ODD SEMESTER)

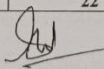
Class: III Sem Lab Batches: B1(2SD21CH001 to 2SD21CH013) B2 (2SD21CH014 to 2SD21CH026) Class Room:16

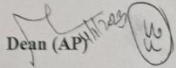
Days	8-00am to 9-00am	9-00am to 10-00 am	10-00am to 10-30am	10-30am to 11-30 am	11-30am to 12-30 pm	12-30pm to 1-30 pm	1-30 pm to 2-30 pm	2-30 pm to 3-30 pm	3-30pm to 4-30 pm
Monday		GPC (T)	TEA BREAK	PT	EM- III	AEC	LUNCH BREAK		
Tuesday		PT		EM- III	UHV-I				FM / PT Lab
Wednesday	CPC	EM- III		CED					FM / PT Lab
Thursday	CPC	UHV-I		FM	PT				CED
Friday		FM		EM- III	CIPE				
Saturday	FM(T)	AEC		FM(T)	CPC (T)				

NOTE: This time table will be in force from 04-01-2023

Course Code	Course Title	Credits	Course Instructor
21UMAC300	Engineering Mathematics-III	3	Dr. D. P. Basti
21UCHC300	Process Calculations	3	Prof. Ashoka H. S
21UCHC301	Fluid Mechanics	3	Dr. Lokeshwari N.
21UCHC302	Particulate Technology	3	Dr. Rashmi S. H
21UCHC303	Chemical Engineering Drawing	3	Dr. Shivanand Y.A
21UAEE330	Ability Enhancement Course (Principles in Chemical Engg-I)	2	Prof. S. S. Inamdar/ Prof. Kirankumar Rathod
21UHUC300	Universal Human Values -I	2	Dr. Rashmi S. H
21UHL304	Fluid Mechanics Laboratory	1.5	Dr. Lokeshwari N
21UHL305	Particulate Technology Laboratory	1.5	Dr. Rashmi S. H/ Dr. Keshava Joshi
21UHUA300	The Constitution of India and Professional Ethics	Audit	
Total Credits offered		22	


 Staff In charge


 HOD

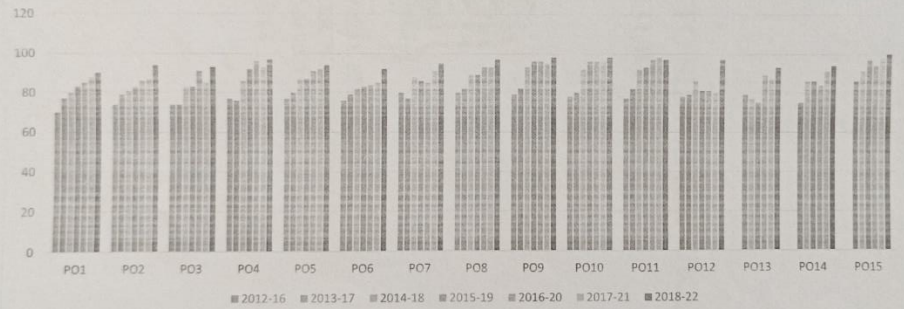

 Dean (AP)

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**Department of Chemical Engineering
Progress in PO/PSO attainment**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
2012-16	70	74	74	77	77	76	80	80	79	78	77	78			
2013-17	77	79	74	76	80	79	77	82	82	80	82	79	79	75	
2014-18	80	81	83	86	87	82	88	89	93	92	92	86	77	86	
2015-19	83	83	83	92	87	83	86	89	96	96	93	81	89	86	
2016-20	85	86	91	96	91	84	85	93	96	96	97	81	89	84	
2017-21	88	87	85	93	92	85	91	93	95	96	98	80	87	91	
2018-22	90	94	93	97	94	92	95	97	98	98	97	97	93	94	100

PO/PSO Attainment



**INDUSTRIAL VISIT TO SHREE RENUKA
SUGARS Ltd.(31/03/2022)**



**DEPARTMENT OF CHEMICAL ENGINEERING
S.D.M. COLLEGE OF ENGINEERING & TECHNOLOGY,
DHARWAD-580002
2021-2022**



Department of Chemical Engineering
SDMCET-Dharwad
Report on

Industrial Visit

To
Aditya Birla Chemicals (INDIA) Ltd.
Binaga Karwar

By
Department of Chemical Engineering SDMCET, Dharwad
On Date: 08th October, 2022

No of Students: VII semester, 32 students
Faculty Visited: Prof. Kirankumar Rathod

Faculty Coordinator	Kirankumar Rathod	
HOD	Shivraj V.A	

(Academic Year : 2022-23)



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Department of Chemical Engineering
SDMCET-Dharwad
Report on

Industrial Visit

To
EPSILON CARBON TORANGALLU
BELLARY

By
Department of Chemical Engineering SDMCET, Dharwad
On Date: 3rd Nov 2022

No of students: 24
Faculty Visited: Dr. Keshava Joshi
(Academic Year: 2022-23)

Faculty Coordinator	Dr. Keshava Joshi	
HOD	Dr. Shivanand Y. A.	



Department of Chemical Engineering
SDMCET-Dharwad

**Report on
Seminar
On**

**Climate change and its Impacts
On Account of World Environment Day 2022
Conducted by**


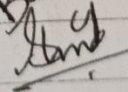
Department of Chemical Engineering SDM CET, Dharwad
Sponsored by IChE-BRC Chapter Bangalore
(75th Year of Celebration of IChE)

Date: 6th June 2022

**Venue: Seminar Hall-SDMCET
No of students: 100
Resource person**

Dr. R.H. Patil, HoD- Meteorology Department UAS Dharwad
Smt. Pushpalata C.M, Senior Civil Judge. Member Secretary, Dharwad
Smt. Shobha L. Pol, Environmental Officer, KSPCB-Dharwad

(Academic Year: 2021-22)

Faculty Coordinator	Dr. Keshava Joshi	
HOD	Dr. Shivanand Y. A.	

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F3: Research Components

Faculty Research Publication

Sl. No	Name of faculty	Title of Paper	Name of the Journal	Volume, Issue, Page No.
2021-22				
1.	Lokeshwari N Keshava Joshi	Studies on removal of RBB and Safranin-O dyes from aqueous solution using concentrated acid treated red mud (CATRM) as adsorbent	Review of Adhesion and Adhesives	10(4), 2022. Q3 and Scopus ✓
2.	Keshava Joshi	Assessment of twist tape thermal performance in heat transfer passive augmentation technique	Beni-Suef University Journal of Basic and Applied Sciences	2022, 11(29), Pg:1-13 Scopus ✓
3.	Keshava Joshi	Investigation of newly designed Alternate Perforated V-Notch (APVN) twisted tape with heat transfer characteristics	Results in Engineering	April 2022 Elsevier Publication Q1, Scopus and SCI https://doi.org/10.1016/j.rineng.2022.100425
4.	Keshava Joshi Lokeshwari N	Biosynthesis of Nanoparticles Using Agriculture and Horticulture Waste	Biotechnology for Zero waste: Emerging waste management Technique	Book Editor(s):Chaudhery Mustansar Hussain, Ravi Kumar Kadeppagari Wiley publications Jan 2022
5.	Keshava Joshi Lokeshwari N	Water Pollution from Construction Industry: An Introduction	J. A. Malik and S. Marathe (eds.), <i>Ecological and Health Effects of Building Materials</i> Springer	2022 Pg: 245-257 Springer ✓
6.	Lokeshwari N Keshava Joshi	Application of Nanoparticles in Construction Industries and Their Toxicity	J. A. Malik and S. Marathe (eds.), <i>Ecological and Health Effects of Building Materials</i> Springer	2022 Pg: 147-157 Springer ✓

Indexed papers - 05
Others - 01
06

TWO FACULTY

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Chapter 13 Water Pollution from Construction Industry: An Introduction



Keshava Joshi, Lokeshwari Navalgund, and Vinayaka B. Shet

Abstract Water is one of the key natural resources utilized for drinking and other developmental purposes. Water is said to be polluted, when the quality of water is harmful to environment and human health due to unwanted materials entering into the water bodies. Water pollution is a problem that cannot be tolerated even by a construction sector. The pollutants and toxic chemicals generated at the construction sites should be managed well, before discharged into the water bodies. The contaminants like cement, paint, glues, sand, heavy metals, oil, toxic chemicals generated at construction sites enter water bodies due to runoff. Pollutants from construction sites can soak into the groundwater as well, which is more difficult to treat than the surface water. Chemical pollutants especially toxic chemicals, arsenic, lead entering into the water bodies can have a serious human health impact including cancer. Wastewater from the construction sites creates severity to the environment as it can harm or disrupt the entire ecosystem. Managing how much pollution of water can be minimized is a challenging issue to balance between construction business and environment. Hence proper planning is needed to bring the strategies and its implementation in mitigating the water pollution from construction industries.

Keywords Groundwater pollution · Health effects · Strategies · Toxic chemicals · Water bodies

13.1 Introduction

According to sociologist Gideon Sjoberg, the development of the city depends on good environment, fresh climate and water, advanced technology, strong community relation to ensure community steadiness and budget. Construction is an economic

K. Joshi (✉) · L. Navalgund
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Belagavi), Dharwad 580002, Karnataka, India

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Nitte, Mangalore 574110, Karnataka, India

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J. A. Malik and S. Marathe (eds.), *Ecological and Health Effects of Building Materials*,
https://doi.org/10.1007/978-3-030-76073-1_13

(41)

Chapter 9 Application of Nanoparticles in Construction Industries and Their Toxicity



Vinayaka B. Shet, Lokeshwari Navalgund, Keshava Joshi,
and Silvia Yumnam

Abstract Global development is reflected in the growth of the construction field. To improve the construction related activity and impart the beneficial essence of current technology, nanoparticles are used by the industries at different stages. The size dependent properties of nanoparticles in the construction industry is considered for enhancing material strength, crack recovery, self-cleaning applications, antimicrobial coating, energy conservation and restoration of cultural heritage. Nanoparticles used in the construction industries reach the ecosystem through multiple channels and cause environmental implications such as adverse effects on environmentally relevant microbial species, algae, plants, and entry into the food chain. The exposure to nanoparticles by human beings also causes various health implications such as DNA damage, inflammation and cell death. Therefore, it has become crucial to determine toxicity and assessment of risk during the use of nanoparticles. Their toxicity depends on chemical and physical attributes. Uniform global regulatory policy needs to be framed to assess the toxicity, risk and approval of nanoparticles in the construction industries.

Keywords Additive · Antimicrobial · Health · Nanocoating · Nanoparticle · Thermochromic · Toxicity

V. B. Shet (✉)
Department of Biotechnology Engineering, NMAM Institute of Technology (V.T.U., Belagavi),
Nitte 574110, Karnataka, India

L. Navalgund · K. Joshi
Department of Chemical Engineering, SDM College of Engineering and Technology (V.T.U.,
Belagavi), Dharwad 580002, Karnataka, India

S. Yumnam
College of Pharmacy, Gachon University, 191, Hambakmoero, Yeonsu-gu, Incheon 21936,
Republic of Korea

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J. A. Malik and S. Marathe (eds.), *Ecological and Health Effects of Building Materials*,
https://doi.org/10.1007/978-3-030-76073-1_9

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24

Biosynthesis of Nanoparticles Using Agriculture and Horticulture Waste

Vinayaka B. Shet¹, Keshava Joshi², Lokeshwari Navalgund², and Ujwal Puttur¹

¹Department of Biotechnology Engineering, NIMAM Institute of Technology (Visvesvaraya Technological University, Belagavi), SH1, Karkala, Nitte 574110, Karnataka, India

²Department of Chemical Engineering, SDM College of Engineering and Technology (Visvesvaraya Technological University, Belagavi), Dhanwad, 580 002, Karnataka, India

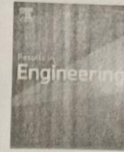
24.1 Introduction

Nanotechnology plays an important role and includes materials, technologies, and processes that are adopted to enhance the rate of production and create products that are in demand for everyday use. The study of nanotechnology comprises material that is extremely small in size ranging between 1 and 100 nm. Emerging and unique properties of nanomaterial such as optical, magnetic, and electrical have the probable prospects of impacts in the area of medicine, electronics, and other fields of applications [1]. Most of the synthesized nanomaterials exhibit different properties and effects when compared to the similar material in a macroscale, as they have high surface area-to-volume ratio. The development of nanoscience will change and develop next-generation materials that are durable, lighter, and stronger than the materials used today in different fields of applications. Physical, chemical, and mechanical methods are widely used for the synthesis of nanoparticles; however, the process is not economic and adheres the use of toxic chemicals. Thus, there is a need for an eco-friendly and cost-effective biological route for the synthesis of nanoparticles to overcome any toxicity towards human health and the environment as well. Hence, the biosynthesis of nanoparticles is gaining importance in the current nanoscience research. Biosynthesis of nanoparticles refers to use of living systems such as microorganism and plant material for the synthesis of nanoparticles through reduction mechanisms. One such option is to channelize underutilized agricultural and horticultural wastes into biosynthesis of nanoparticles, as it is observed that relatively few research articles are surveyed and evaluated.

The magnitude of organic waste generated worldwide by agricultural and horticultural activity is exceptionally large and offers potential renewable sources of bioactive compounds and biomolecules. The availability of resources has created a unique opportunity to develop new methods of waste management and recycling strategies.

Biotechnology for Zero Waste: Emerging Waste Management Techniques, First Edition,
Edited by Chaudhery Mustansar Hussain and Ravi Kumar Kadeppagari.
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Investigation of newly designed Alternate Perforated V-Notch (APVN) twisted tape with heat transfer characteristics

Prashant B. Dehankar^{a,*}, Keshava Joshi^b, Vijay A. Bhosale^a, Kalyan I. Patil^a

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ARTICLE INFO

Keywords:

Heat augmentation
V-notch-twisted tape
Passive technique
Pipe in pipe heat exchanger
Porosity
Thermal efficiency

ABSTRACT

Swirl device is seen as a path to enhance the efficiency of a thermal switch. Swirl device with fabricated form of porosity and v-cuts twisted tape (tt) inner pipe insert helps to augment performance by improving the heat transfer (U) coefficient. This work is related to the thermal performance factor (TPF), friction factor (f) and Nusselt (NNu) number in the inner tube inserted with a innovative design of Alternate Perforated V-Notch (APVN) tape having twisted ratio 6.25 incorporating porosity amount of $R_p = 1.087\%$ and width (w/W) ratio = 0.333, were investigated features to improve heat transfer rate. Enhancement in turbulent generation of the primary flow into the secondary flow with this design. Experiment test was performed on a pipe in pipe tubes of (d) internal diameter of 0.013 m with test section length of 0.9 m. Temperature of the warm water had kept constant at 60 °C within the Reynolds number range of 2246–16,224. The heat exchanger with empty tube (without tt) and the input of normal twisted tape (tt) has been checked. In addition to the investigated range, NNu, f and TPF in the tube with APVN twisted tape insertion were observed (R_p - ratio) 1.833–2.276, 2.155–4.549 and 1.84–1.778 times more than the values of empty tube. The presented work is very useful in the field of energy conservation through maximum transfer of heat in the industrial process.

1. Introduction

Many applications carried out by chemical engineers involve production and adsorption of energy in the form of heat. Heat is an energy form and it is nothing but a capacity to do work. Science which deals with the rate of exchange between hot and cold bodies leads to heat transfer. In heat transfer, study how and at what rate heat is transferring and temperature distribution inside the body.

Double pipe heat exchanger [1] is simple heat transfer equipment as shown in Fig. 1 it contains two concentric pipes. In which there separates a cold and hot fluid. In pipe heat exchanger according to transport of hot or cold fluid there are following different types: cocurrent, counter current and cross flow. In industries mainly counter current flow has been used.

It is a concentric pipe heat transfer apparatus containing two concentric pipes, concentric tees and return head and bend etc. Inner pipe is supported with the outer pipe by packing glands. Each pair of devices is known as hairpin Fig. 1.

1.1. Swirl generated device

Swirl flow or second rotation of the axial flow channel is produced by this. Swirl generated device Fig. 2 includes helical twisted tape, half twisted, full twisted and various types of tapes also mixed and heat transfer enhancement by elliptical shape inner pipe using twist tape.

1.2. Augmentation in Heat transfer

Improving heat transfer is the process of increasing the efficiency of heat exchangers. This can be achieved when the heat transfer capacity of a particular device is increased or when the pressure losses generated by the device are reduced. Heat transfer augmentation mechanisms are as following types.

1) Active Method

In this technique there is some external power to the contacting surface like vibration by cams and reciprocating plungers, magnetic/

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<https://doi.org/10.1016/j.rineng.2022.100425>

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REVIEW

Open Access

Assessment of twist tape thermal performance in heat transfer passive augmentation technique



Prashant B. Dehankar^{1*}, Keshava Joshi², Vijay A. Bhosale¹ and Rishikesh N. Mulik¹

Abstract

Processing processes such as petrochemical, refineries, pharmaceutical, thermal, chemical, and integrated chemical industries such as the food, dairy and sugar industries have been widely used for heat exchange. Additional techniques have been used in the formulation of various twist geometry gestures such as helical film, triangular/rectangular/trapezoidal tape, HiTrain wire matrix mould, a novel turbulator with a diameter (p/d), well placed/separated broken twisted tapes, conic splitting, and other geometric tapes are well researched with Reynolds number range 13–500,000 liquid processing solutions such as ethylene glycol and turbine oil respectively. This paper also highlighted the impact of circular holes, rectangular holes, angle of entry, wavy rate and tape size in the optimal temperature parameter such as thermal enhancement factor 1.04–3 varies with Reynolds' number from 100 to 20,000. By test/numerical reading the curved ratio was calculated from 0.25 short lengths to 20 trapezoidal cuts with tape geometry through various reviews. The Jacobean matrix associated to the linear equation is given by,

$$J(X) = \begin{bmatrix} \frac{\partial f_1}{\partial T_2} & \frac{\partial f_1}{\partial T_4} \\ \frac{\partial f_2}{\partial T_2} & \frac{\partial f_2}{\partial T_4} \end{bmatrix}$$
$$\frac{\partial f_1}{\partial T_2} = -Q_h C_p \rho$$
$$\frac{\partial f_1}{\partial T_4} = -Q_c C_p \rho$$
$$\frac{\partial f_2}{\partial T_2} = -Q_h C_p \rho - \left\{ \frac{[UA\{(T_1 - T_2) - (T_4 - T_3)\}] \left[\frac{(T_1 - T_2)}{(T_2 - T_3)} \right]^2}{\ln \left[\frac{(T_1 - T_2)}{(T_2 - T_3)} \right]} \right\}$$

Compared to a blank tube, the heat transfer rate and the friction factor improved by 20% when using full-length tapes $y=2.5$, and NNu increased 9 times to $y=3.125$. There is a 30–40% increase using different twisted tapes. This in-depth study is common use in industrial systems to gain power.

Keywords: Heat transfer, Swirl flow, Active technique, Twisted tapes, Helical tape, Trapezoidal wings, Wire matrix, Micro-fin tube, Enhancement efficiency

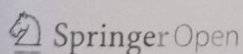
1 Background

Conduction, convection and radiation are the three mechanisms by which heat is transferred. A heat exchanger is a system that allows heat to be transferred between two fluids of different temperatures. It occurs

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Full list of author information is available at the end of the article



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Share

Studies on removal of RBB and Safranin-O dyes from aqueous solution using concentrated acid treated red mud (CATRM) as adsorbent

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Department of Chemical Engineering, SDM College of Engineering and Technology (V.T.U., Belagavi), Dharwad-580 002, Karnataka, India

Keshava Joshi

Department of Chemical Engineering, SDM College of Engineering and Technology (V.T.U., Belagavi), Dharwad-580 002, Karnataka, India

Umesh Deshannavar

Department of Chemical Engineering, KLE DR. M. S. Sheshgiri College of Engineering and Technology, Belgaum, Karnataka, (KLEDRMSSCET) India

Vinayaka B. Shet

Department of Biotechnology Engineering, NMAM Institute of Technology (V.T.U., Belagavi), Nitte-574110, Karnataka, India

Sampath Emani

Individual Collaborator, India

Gurunadh Velidi

Department of Aerospace Engineering, University of Petroleum and Energy Studies, India

Abstract

Applying the by-product or industrial waste from one industry to treat wastewater of another manufacturing unit would solve the environmental problems and also helps in the disposal of both solid and water waste. Red mud (RM), a by-product or waste from the alumina manufacturing unit, causes a severe threat to the environment. The current investigation emphasis

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(43)

Department of Chemical Engineering
Funded Project Proposal submitted by the department

S. No	Name of the Faculty	Title of the Project	Date of submission	Type and amount (Rs)	Name of the Agency
1.	Dr. Rashmi S.H Dr. Shivanand Y.A	Preparation and Characterization of Chitosan-Based Nanocomposites for Food Packing Applications	Dec 2022	2.00 Lakh	SDMCET-SEED Money
2.	Dr. Keshava Joshi Dr. Lokeshwari N	Hybrid desalination technology using solar energy	18-02-2022	40 Lakh	VGST-CESEM
3.	Dr. Rashmi S.H	Extraction of chitin from marine sources and preparation of chitosan based functional biopolymers for sustainable applications in food packaging and drug delivery	18-02-2022	15 Lakh	VGST-K-FIST
4.	Dr. Rashmi S H PI Dr. Keshava Joshi Co-PI	Extraction and characterization of chitin and chitosan from crustacean shells and their applications: A constructive waste management approach	15-01-2022	2.46 Lakh	KSCST-FPP
5.	Dr. Keshava Joshi PI Dr. Lokeshwari N Co-PI	"Process integration and advanced wastewater treatment for optimal use of water in the sugar industry	10-01-2022	Scheme: Optimal Water Use in Industrial Sectors 2021 65.8 Lakh	DST

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Phone: 0836-2443327 & 2443327 | Fax: 0836-2464638 | email: principal@sdmcet.ac.in | website: www.sdmcet.ac.in

179/2022-23
S.D. GANAPATH
R.S., M.Tech., Ph.D.
PRINCIPAL

Date:

9 JAN 2022

SEED MONEY GRANT

To inform you that the Management has sanctioned Seed grant of Rs.1,50,000/- (One Lakh
Thousand Rupees) to Dr. Rashmi S H (Principal Investigator - PI) and Dr. Shivanand Y A
(Co-PI) "Preparation and Characterization of Chitosan-Based Nanocomposites for Food
Packaging Applications". The amount shall be disbursed in two installments during the entire
duration of TWO years. The grant must be exclusively utilized for the said project and the
members must adhere to the following:

- i. PI is responsible for the administration of granted funds and he/she must be ascertaining that over-expenditures do not occur.
- ii. Deliverables in terms of publications, patents and external funded projects committed at the time of project presentation is a must.
- iii. The project work shall be carried out without any detriment to the regular academic work.
- iv. Regular progress review meeting shall be conducted, and report needs to be submitted to the expert committee periodically.
- v. SDME Society Rules and regulations
- vi. Seed Money Policy of SDMCET

Wishing you all the best.

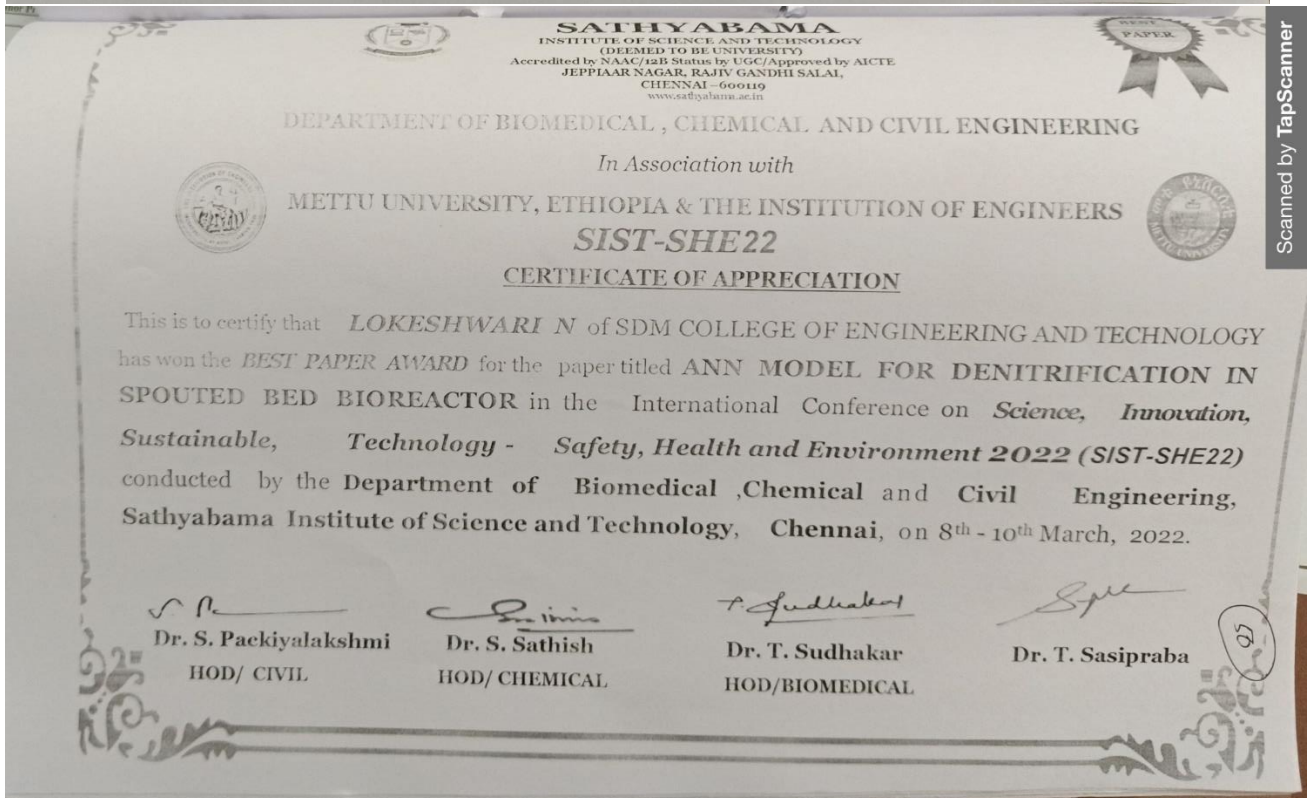
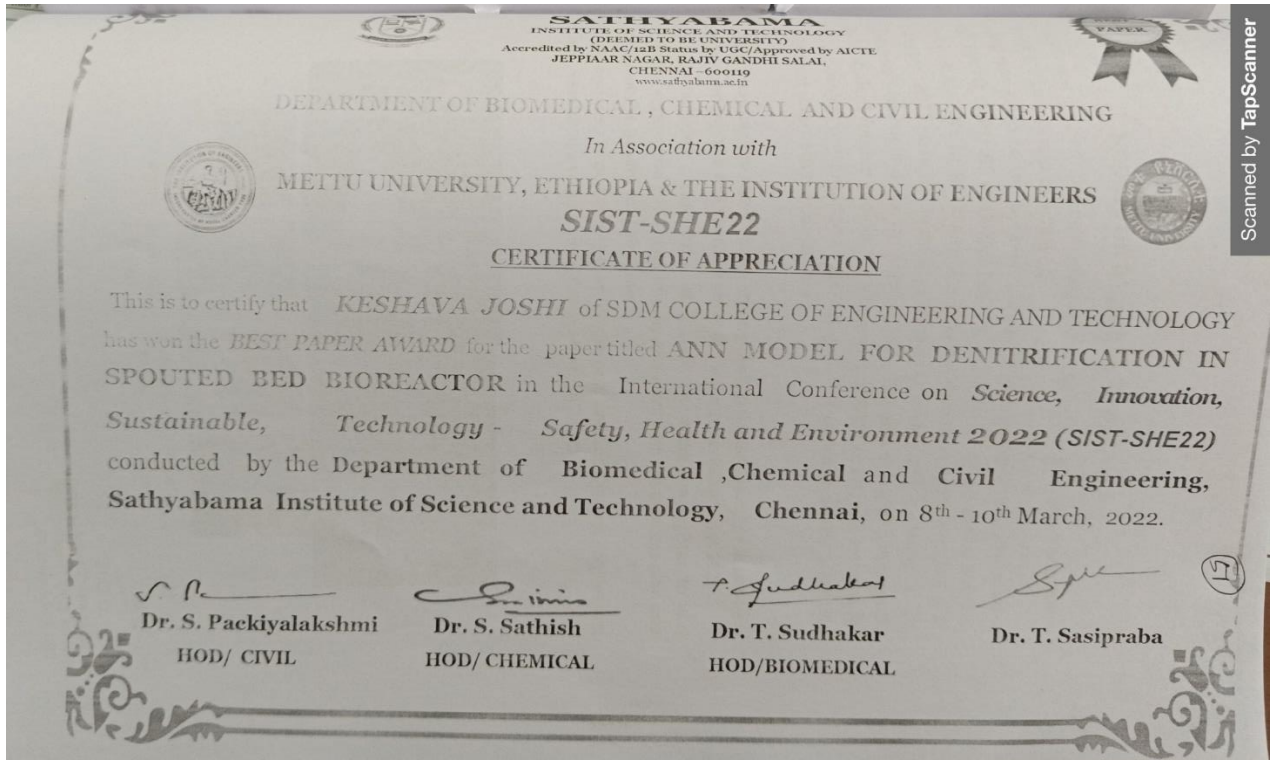
With Regards

S.D. Ganapath
PRINCIPAL

Copy to: i) HOD Civil, ii) Department R&D notice board, iii) EST, iv) Accounts Section

**Department of Chemical Engineering
Faculty Conference Papers**

Name of the Faculty	Details of the Conference Papers	Date and Place	No of Days
Dr. Keshava Joshi	<p align="center">2021-22</p> ANN modeling for denitrification process using spouted bed bioreactor" at International Conference on Science, Innovation, Sustainable, Technology – Safety, Health and Environment 2022 (SIST-SHE22) organized virtually by Sathyabama Institute of Science and Technology. Best Paper award	8 th -10 th March 2022	3 Day
Dr. Lokeshwari N	Source identification and apportionment of PM10 in Hubli-Dharwad City, Karnataka. India using PMF5 model" at International Conference on Science, Innovation, Sustainable, Technology – Safety, Health and Environment 2022 (SIST-SHE22) organized virtually by Sathyabama Institute of Science and Technology. Best Paper award	8 th -10 th March 2022	3 Day



Report on Manthan Prize 2022

Department of Chemical Engineering at SDMCET-Dharwad, faculty and student teams are very proud to achieve the Manthan 2022 Business plan award. This award was given to the business plan on "DESIGN AND FABRICATION OF A SYSTEM TO CAPTURE AMBIENT CO₂." This work was carried out by SAGIR.K. KHAN, SHASHANK.M. BALIGAR, PREKSHA KUMARI BAFNA, AYESHA NADAF of 8th semester 2022 batch Chemical Engineering under the guidance of Dr. Kameshwari Navalgund and Dr. Keshava Joshi. This project was also selected by SDCT student funded project for an amount of 8000 Rs and was selected for the best project presentation at VTU Belagavi. This work is also being presented at different International conferences.

The team has bagged the 5th prize among the top 6 teams selected in the final round from among the 652 teams from south India zone on 18th Sept 2022.

The prize includes a cash prize of 2 Lakh. The team can register to atal incubation center and get a seed money and work with the business plan and also submit the patent for the same.

We are also very proud to say that it's the only one and the first engineering college in Karnataka to gain this prize in Manthan 2022.



Sagir Khan



Shashank Baligar



Preksha Bafna



Ayesha Nadaf

H.O.D.

Department of Chemical Engineering
SDM College of Engg & Technology,
Dharwad-580 002

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Department of Chemical Engineering
Students Training

Sl. No.	Name of the Training	No of Participants	Date and Venue Resource person	Academic Year
1.	Process Control	Chemical: 32	28 th and 29 th Dec 2022	2022-23
2.	Waste Water Analysis and Training in Atomic Absorption Spectrophotometer for the analysis of Trace Elements	Chemical: 24	2nd & 3rd Dec. 2022 Nichrome Testing Laboratory and Research (P) LTD., Dharwad Dr. Krishna Kulkarni	2022-23
3.	Aptitude Training	All Branches	17th, 18th & 19th June 2022 Ms. Ragini, Innovation Unlimited, Bangalore	2021-22
4.	Aptitude Training	All Branches	7th to 10th July 2021 Ms. Ragini, Innovation Unlimited, Bangalore	2021-22
5.	Python training Program	Non-IT Branches	27th Aug to 30th Sept 2021 Ms. Amina Naaz Aprimit Technologies , Bangalore	2021-22
6.	Aptitude Training	All Branches	4 th , 5 th , 11 th & 12 th Dec 2021 Ms. Ragini, Innovation Unlimited, Bangalore	2021-22
7.	C program	Non-IT Branches	09.3.2022 to 20.03.2022 Mr. Vijay Mahantesh Cleverbit Solutions, Banglaore	2021-22
8.	Real Time Interfacing Process Modelling & Control	24	20-21 Jan 2022 Dr. MeenatchiSundaram, Technical consultant, and Mentor Advanced Control Equipments, Miraj	2021-22



Department of Chemical Engineering

S.D.M College of Engineering and Technology, Dharwad 580002

A REPORT



on

TWO-DAY TRAINING

Date: 20th – 21st January, 2022

Topic: Real Time Interfacing, Process Modelling & Control

Resource Person: Dr. Meenatchi Sundaram,
Technical consultant, and Mentor
Advanced Control Equipments, Miraj

Staff Incharge	Prof. Shivanand Y. A	 27/1/22
HOD	Prof. Shivanand Y. A	 27/1/22
Students	VII sem	

2021-22



Department of Chemical Engineering
S.D.M College of Engineering and Technology, Dharwad 580002

A REPORT
on
TWO-DAY TRAINING

Date: 25th – 26st December, 2022

Topic: Process Modeling & Control

Resource Person: Dr. Meenatchi Sundaram,
Technical consultant, and Mentor
Advanced Control Equipments, Miraj

Students XXXX	VII sem	
Incharge	Prof. S.S. Inamdar Prof. Shivanand Y. A	
HOD	Prof. Shivanand Y. A	

2022-23



SDM College of Engineering and Technology, Dharwad-02
Department of Chemical Engineering
Training Programme
Through CIIE-SDMCET, DWD.

Sem: V

Date: 2nd & 3rd Dec. 2022

Training Module: Waste Water Analysis and Training in Atomic
Absorption Spectrophotometer for the analysis of
Trace Elements

Resource Person: Dr. Krishna Kulkarni, NTLR Private Limited,
Dharwad.

Venue: Nichrome Testing Laboratory and Research Private Limited,
No. 170 2nd Main, Judges Bungalow Road, Narayanpura,
Dharwad, Karnataka 580008

Staff Incharge	Dr. Rashmi S. H.	
HOD	Dr. Shivanand Y. A.	

2022-23

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F6: Placements and Internships

Department of Chemical Engineering Details of the Students' Placement and Higher studies

Academic Year	No. of Students registered	Total students Placed	Total students for Higher Studies	% Placement and Higher studies	No of companies	Average Salary Package
2020-21	26	17	-	68%	10	4.0 Lakh

Department of Chemical Engineering Details of the students with Placement Details

Sl. No	Name of the student	On/Off Campus Date of Joining	Company Details	Salary Details (Rs In Lakh Per Annum)
2021-22				
1.	TANMAYI CHANDRASHEKHAR	ON CAMPUS	BAGALKOT CEMENT & INDUSTRIES LIMITED	2.4
2.	ANUSHA RAICHUR	ON CAMPUS	WIPRO LIMITED PIGEON EDUCATION TECHNOLOGY, ANTSTACK.IO	3.5 5.0 4.0
3.	PRIYANKA ASHOK PATIL	ON CAMPUS	BAGALKOT CEMENT & INDUSTRIES LIMITED	2.4
4.	SHASHANK.M.BALIGAR	ON CAMPUS	PIN CLICK	4.8
5.	APPASAB KANTAPPA WAGHAMORE	ON CAMPUS	BAGALKOT CEMENT & INDUSTRIES LIMITED	2.4
6.	GAURI V ALLE	ON CAMPUS	COGNIZANT-GENC INFOSYS BAGALKOT CEMENT & INDUSTRIES LIMITED	4 3.6 2.4
7.	SUJEETSINGH THAKUR	ON CAMPUS	PIN CLICK	4.8
8.	SAGIR KAMAL KHAN	ON CAMPUS	VRIZE	6.5
9.	ARCHANA S MALEKOPPA	ON CAMPUS	BAGALKOT CEMENT & INDUSTRIES LIMITED	2.4
10.	AYESHA ABDULAZIZ NADAF	ON CAMPUS	PIN CLICK BYJU'S	4.8 6.0
11.	NAMRATA T BADIGANAVAR	ON CAMPUS	UNSCHOOL UP TECH BAGALKOT CEMENT & INDUSTRIES LIMITED	5.0 2.48 2.4
12.	DHANASHREE DATTARAYA RANE	ON CAMPUS	CSB BANK	3.0
13.	PRIYANKA S KURDIKERI	ON CAMPUS	UP TECH	2.48
14.	MUJAWAR ANISA SHAKIL	ON CAMPUS	PIN CLICK	4.8
15.	GOURISHANKAR PANCHAXARIMATH	ON CAMPUS	PIN CLICK WIPRO	4.8 3.5
16.	PREKSHA	ON CAMPUS	UNSCHOOL VRIZE	5.0 5.0
17.	BAVU GHATAKAMBLE	ON CAMPUS	BAGALKOT CEMENT & INDUSTRIES LIMITED	2.4

(60)

Department of Chemical Engineering
Industry Internships for 2022-23

Name of the Student	Name of the Company	From date	To date	Duration (days)
NARASANAGOUDA PATIL	Vigneshwar Polymers Ltd, Dharwad	22.08.2022	22.09.2022	32 days
BHAGYASHREE KORI	Pepsi Varun Beverages Ltd, Dharwad	10.08.2022	10.09.2022	32 days
PRIYANKA	Vigneshwar Polymers Ltd, Dharwad	22.08.2022	22.09.2022	32 days
MANJUNATH NARAGUND	Vigneshwar Polymers Ltd, Dharwad	22.08.2022	22.09.2022	32 days
NAMEERA SHAIKH	Kirit Home Industries	03.03.2022	02.04.2022	31 days
SHRIPRIYA AGNOHOTRI	Kirit Home Industries	03.03.2022	02.04.2022	31 days
VAIBHAVI TOTAD	Kirit Home Industries	03.03.2022	02.04.2022	31 days
ABHISHEK BADIGER	Dharwad, Haveri, Gadag and Uttarakannada Districts Co-Operative Milk Union Ltd., Dharwad	17.08.2022	01.09.2022	16 days
ABHISHEK BADIGER	Nichrome Testing Lab. & Research Pvt, Ltd, Dharwad	30.08.2021	30.09.2021	31 days
AKASH B	Dharwad, Haveri, Gadag and Uttarakannada Districts Co-Operative Milk Union Ltd., Dharwad	17.08.2022	15.09.2022	30 days
AKASH GAWADE	Aditya Birla Hindalco Industries Ltd, Belagavi	10.08.2022	09.09.2022	31 days
AMRUTA DESHPANDE	Pepsi Varun Beverages Ltd, Dharwad	10.08.2022	10.09.2022	32 days
ANISHKA GHODKE	Pepsi Varun Beverages Ltd, Dharwad	10.08.2022	10.09.2022	32 days
ANKITA KULKARNI	Dharwad, Haveri, Gadag and Uttarakannada Districts Co-Operative Milk Union Ltd., Dharwad	01.09.2021	30.09.2021	30 days
DEVINAND PRABHU	Mangalore Refinery and Petrochemicals Ltd, Mangalore	01.08.2022	18.08.2022	18 days
GANESH KESAPNATTI	Shree Renuka Sugar Ltd., Munoli	04.09.2021	04.10.2021	31 days
GANESH KESAPNATTI	Mangalore Refinery and Petrochemicals Ltd, Mangalore	01.08.2022	18.08.2022	18 days
JAYESH BHOMKAR	Nichrome Testing Lab. & Research Pvt, Ltd, Dharwad	30.08.2021	30.09.2021	31 days
JAYESH BHOMKAR	Dharwad, Haveri, Gadag and Uttarakannada Districts Co-Operative Milk Union Ltd.,	17.08.2022	01.09.2022	16 days

		Dharwad			
38	KALYANKUMAR SUNDAKAR	Vishwaraj Sugar Industry Pvt, Ltd, Bellad-Bagewadi	28.07.2022		
39	LALESAB MAHISHAWADAGI	Vigneshwar Polymers Ltd, Dharwad	22.08.2022	28.08.2022	31 days
40	NAYANA B DODDWARD	Dharwad, Haveri, Gadag and Uttarakannada Districts Co-Operative Milk Union Ltd., Dharwad	01.09.2021	22.09.2022	32 days
41	NIKITA SAWANT	Omkrown Pharmachem Pvt. Ltd, Belagavi	01.09.2021	30.09.2021	30 days
42	POOJA JAKKANAWAR	Omkrown Pharmachem Pvt. Ltd, Belagavi	01.09.2021	30.09.2021	30 days
43	PRAVEEN B TUPPAD	Vigneshwar Polymers Ltd, Dharwad	22.08.2022	30.09.2021	30 days
44	SANATH SHETTY	BASF India Ltd., Mangalore	01.08.2022	22.09.2022	32 days
45	SAYEDA KHADRI	Dharwad, Haveri, Gadag and Uttarakannada Districts Co-Operative Milk Union Ltd., Dharwad	01.09.2021	31.08.2022	31 days
46	SHAMBHAVI VYAS	Nestle India Ltd, Nanjangud Factory, Mysore District	08.08.2022	30.09.2021	30 days
47	SHIV SHASHANK SHETTY	Mangalore Refinery and Petrochemicals ltd, Mangalore	01.08.2022	18.08.2022	18 days
48	SHIV SHASHANK SHETTY	Dharwad, Haveri, Gadag and Uttarakannada Districts Co-Operative Milk Union Ltd., Dharwad	12.09.2022	26.09.2022	15 days
49	SHIVAKUMAR BHAJANTRI	Dharwad, Haveri, Gadag and Uttarakannada Districts Co-Operative Milk Union Ltd., Dharwad	24.08.2022	23.09.2022	30 days
50	SHRINIDHI G K	Shree Renuka Sugar Ltd., Munoli	04.09.2021	04.10.2021	31 days
51	SHRINIDHI G K	Mangalore Refinery and Petrochemicals ltd, Mangalore	01.08.2022	18.08.2022	18 days
52	SWATI PATIL	Dharwad, Haveri, Gadag and Uttarakannada Districts Co-Operative Milk Union Ltd., Dharwad	01.09.2021	30.09.2021	30 days
53	VAISHNAVI A	Bhuruka Gases Ltd, Bangalore	01.08.2022	30.08.2022	30 days
54	YASHAS JAMES P A	Mangalore Refinery and Petrochemicals ltd, Mangalore	06.09.2021	24.09.2021	19 days
55	YASHAS JAMES P A	BASF India Ltd., Mangalore	01.08.2022	31.08.2022	31 days

