

**College of Agricultural Engineering and Technology  
Anand Agricultural University  
Godhra – 389001**

Establishment of New Department at Faculty of  
Agricultural Engineering & Technology

Read : Resolution of 11<sup>th</sup> Special Meeting of the Board of Management held on 20-05-2017, vide item no. 11.19.

**NOTIFICATION**

It is hereby notified to all concerned that the Board of Management of the Anand Agricultural University has resolved vide item No. 11.19 in its 11<sup>th</sup> special meeting held on 20-05-2017 as under;

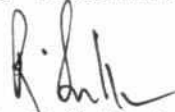
**"It is resolved to have the uniformity with other SAUs as per the recommendation of ICAR 5<sup>th</sup> Deans' Committee, the Board of Management approves in principle the establishment of new departments viz.**

1. **Basic Engineering and Applied Sciences,**
2. **Irrigation and Drainage Engineering**

**in the Faculty of Agricultural Engineering & Technology as recommended by Academic Council."**

No:-AAU/CAET/Acad/ 9220-30 /2017

Date: 05 / 05 /2017

  
(Dr. R. Subbaiah)

Principal & Dean

College of Agril. Engg. & Tech.

**Copy F.w.cs. to:**

1. All the members of the Board of management of this University
2. All the members of the Academic council of management of this University
3. All officers of this University
4. All Deans / Principals of this University
5. The Registrar, Anand Agricultural University, Anand
6. Unit/Sub Unit Officers of this University

**Copy to:**

7. P.S. to Hon. Vice Chancellor, Anand Agricultural University, Anand
8. P.A. to Registrar, Anand Agricultural University, Anand
9. All the HoDs of this college
10. Academic Branch of the university (20 Copies) / this college
11. Notification File

**PROPOSAL SUBMITTED FOR ESTABLISHMENT OF  
DEPARTMENT OF BASIC ENGINEERING AND APPLIED SCIENCES, CAET,  
GODHRA**

Title of the Project/Scheme	:	Establishment of Department of Basic Engineering and Applied Sciences																																																							
Name of College/ Centre	:	College of Agricultural Engineering and Technology, Godhra																																																							
Type of project: Basic/Applied/Extension/Farmer Participatory/ Other (specify):	:	Basic Engineering & Applied Sciences																																																							
Principal Investigator	:	Professor & Head																																																							
Whether the scheme is spill over/expansion or new scheme	:	New Scheme																																																							
Type of scheme	:	Plan Scheme																																																							
Year of Starting	:	2017-18 to 2021-22 (5 years)																																																							
Background information/justification of the scheme	:	<p>Considering contemporary challenges for employability of passing out graduates and to adopt a holistic approach for quality assurance in agricultural education, the Fifth Deans Committee after taking inputs from different levels of stake holders of Agricultural education uttered the need of department of Basic Engineering &amp; Applied Sciences.</p> <p>The Committee has attempted to distribute courses in the following format to inculcate the Basics, Principles and Skills in a systematic way.</p> <p><b>I year</b> – Basic and fundamental courses  <b>II Year</b> – Principles  <b>III Year</b> – Production system  <b>IV Year</b> – Skill and entrepreneurship development</p> <p>Basic &amp; Fundamental courses and principles for agricultural engineering starts with a multidisciplinary education. The Department of Basic Engineering &amp; Applied Sciences (BEAS) after its formation will become an integral part of the College of Agricultural Engineering and Technology, Godhra and will offer a robust, multidisciplinary education in the areas of Electronics, Computer Science, Mechanical, Electrical, Instrumentation, Civil, Physics, Chemistry and Mathematics programs. This is demonstrated by the curriculum with a total load share of <b>41.2%</b> in terms of credits and <b>54.7%</b> in terms of subjects, it will be very encouraging for the faculty engaged in the first two years of agricultural engineering education to have a platform in the form of a department as per the recommendations of Fifth Deans committee.</p> <table border="1"> <thead> <tr> <th>DEPARTMENT</th> <th>SUBJECTS</th> <th>% SHARE</th> <th>CREDITS</th> <th>% SHARE</th> </tr> </thead> <tbody> <tr> <td><b>BEAS</b></td> <td><b>29</b></td> <td><b>54.7</b></td> <td><b>75</b></td> <td><b>41.2</b></td> </tr> <tr> <td>SWE</td> <td>4</td> <td>7.5</td> <td>10</td> <td>5.5</td> </tr> <tr> <td>IDE</td> <td>4</td> <td>7.5</td> <td>10</td> <td>5.5</td> </tr> <tr> <td>FMPE</td> <td>5</td> <td>9.4</td> <td>14</td> <td>7.7</td> </tr> <tr> <td>APE</td> <td>5</td> <td>9.4</td> <td>13</td> <td>7.</td> </tr> <tr> <td>REE</td> <td>3</td> <td>5.6</td> <td>9</td> <td>4.5</td> </tr> <tr> <td>ELECTIVES</td> <td>3</td> <td>5.6</td> <td>9</td> <td>4.55</td> </tr> <tr> <td>EDUCATIONAL TOUR</td> <td></td> <td></td> <td>2</td> <td>1.01</td> </tr> <tr> <td>TRAINING</td> <td></td> <td></td> <td>40</td> <td>21.9</td> </tr> <tr> <td><b>TOTAL</b></td> <td><b>53</b></td> <td><b>100</b></td> <td><b>182</b></td> <td><b>100</b></td> </tr> </tbody> </table>	DEPARTMENT	SUBJECTS	% SHARE	CREDITS	% SHARE	<b>BEAS</b>	<b>29</b>	<b>54.7</b>	<b>75</b>	<b>41.2</b>	SWE	4	7.5	10	5.5	IDE	4	7.5	10	5.5	FMPE	5	9.4	14	7.7	APE	5	9.4	13	7.	REE	3	5.6	9	4.5	ELECTIVES	3	5.6	9	4.55	EDUCATIONAL TOUR			2	1.01	TRAINING			40	21.9	<b>TOTAL</b>	<b>53</b>	<b>100</b>	<b>182</b>	<b>100</b>
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	<p>Also, a total of 9 Assistant professors with strong academic background are already engaged in various multi-disciplinary research and extension works apart from teaching. Faculty concerned with the subjects falling under department of basic engineering and applied sciences are engaged in the PG teaching too.</p> <p>Research within the department will transcend disciplinary and departmental boundaries, offering a unique learning opportunity for both graduate and undergraduate students. Such a collaborative culture will help us develop the next generation of innovations in the field of Agricultural Engineering that will impact the world.</p>
Vision	To emerge as a knowledge nerve and to create educational environment in multidisciplinary education, research for creating sustainable infrastructure and enhancing quality of life.
Mission	<ul style="list-style-type: none"> <li>➤ Providing high quality undergraduate and graduate education with research oriented teaching in tune with changing needs of industry.</li> <li>➤ Generating knowledge and developing technology through quality research in frontier areas of agriculture and interdisciplinary fields.</li> </ul>
Objectives:	<ol style="list-style-type: none"> <li>1. To inform and motivate students to study the fundamental aspects of engineering &amp; science and its applications</li> <li>2. To teach Electronics, Computer Science, Mechanical, Electrical, Instrumentation, Civil Engineering and Physics, Chemistry and Mathematics for UG and PG programs</li> <li>3. To enable the students towards research, to analyze and apply mathematical and scientific techniques in engineering technology</li> </ol>
Infrastructural requirement	<p>: Initially the department may be accommodated in a wing of the existing building, preferably where many of the labs of the said department exists.</p> <p>Further there is a need for expansion of the infrastructural facilities to meet the minimum requirements of the Fifth Deans' Committee report, which includes:</p> <p>Staff seating arrangement and advanced lecture hall with Furniture and Fixtures : 300 Lakhs</p> <p>Different laboratories &amp; Rooms: 120 Lakhs (Append-III)</p> <p>Working sheds : 50 Lakhs</p> <p>Totals Cost : 470 Lakhs</p>
Equipment required (non-recurring)	: 105.00lakhs (details are given in Append-II)
Human resource need	: The 5 <sup>th</sup> Dean Committee constituted by Indian Council of Agricultural Research, New Delhi to decide manpower requirement, infrastructural facilities and other for meeting the qualitative standards of the education across the country. The minimum standards suggested to maintain uniformity among different colleges in the country by ICAR, New Delhi, are to be adopted in the college in toto.

**First five year: Pay and Allowances of staff**

Sr. No.	Name of the Post	Recommended number of Posts	Pay scale	Pay and Allowances, Rs in lakhs					Total
				I	II	III	IV	V	
<b>Teaching Staff</b>									
1	Professor	1	37400-67000	15.0	16.5	18.0	20.0	22.0	<b>91.5</b>
2	Associate Professors	3	37400-67000	45.0	49.5	55.4	59.8	65.8	<b>275.5</b>
3	Assistant Professors	9	15600-39100	63.0	69.3	76.2	83.9	92.2	<b>384.6</b>
<b>Office Staff</b>									
4	Clerk,	1	9300-34800	4.5	5.0	5.3	5.8	6.3	<b>26.9</b>
5	PA/Steno	1	9300-34800	4.3	4.7	5.0	5.8	6.3	<b>26.1</b>
6	Messenger/Peon	1	4440-7440	2.0	2.3	2.6	2.8	3.0	<b>12.7</b>
<b>Laboratory staff</b>									
7	Laboratory Assistant	4	5200-20200	10.0	11.0	12.1	13.3	14.6	<b>61.0</b>
8	Workshop Staff/Computer operator/Driver /Technicians, Nos. 3	6	9300-34800	26.0	28.6	31.5	34.6	38.2	<b>158.9</b>
<b>Total Posts :</b>		<b>26</b>		<b>169.8</b>	<b>186.9</b>	<b>206.1</b>	<b>226</b>	<b>248.4</b>	<b>1037.2</b>

**Costing of Infrastructure and other Items for support:**

( Rs. in Lakhs )

Sr. No.	Component	Years (Rs in lakhs)					Total
		I	II	III	IV	V	
1	Pay & allowances of staff (Professor, Asso. Prof., Asstt. Prof, Admin. And technical Staff)	169.8	186.9	206.1	226	248.4	<b>1037.2</b>
2	Recurring Contingency	50.0	45.0	40.0	35.0	30.0	<b>200.0</b>
3	Non- Recurring (As per attached list)	40.0	30.00	20.0	10.0	5.0	<b>105.0</b>
4	Civil Works	300.0	65.0	65.0	20.0	20.0	<b>470.0</b>
<b>Total estimated Expenditure (Rs in Lakhs)</b>		<b>559.8</b>	<b>326.9</b>	<b>331.1</b>	<b>293</b>	<b>310.4</b>	<b>1812.2</b>

**Appendix-I**

<b>Sr. No.</b>	<b>Name of the Post</b>	<b>Staff requirement as per 5<sup>th</sup> Dean recommendation</b>	<b>Existing staff status in the college</b>
1	Professor	1	0
2	Associate Professors	3	0
3	Assistant Professors	9	9
	<b>Office Staff</b>		
4	Clerk	1	0
5	PA/Steno	1	0
6	Messenger/Peon	1	0
	<b>Laboratory staff</b>		
7	Laboratory Assistant	4	0
8	Senior Research Assistants/ Workshop Staff/ Computer operator/ Driver/Technicians	6	0
	<b>Total</b>	<b>26</b>	<b>9</b>

**Appendix-II**

S.no	Proposal of new instruments to be purchased	Minimum quantity required in the laboratory concerned	Available quantity in the lab concerned	Quantity required to be purchased	Approximate cost (Rs lacs)	Justification/Remarks
<b>A) Computer science and electrical engineering</b>						
<b>Cad lab</b>						
1	Computers	16	10	06	3.60	With only 10 computers more no.of students are working on a single computer because of which students are not in a position to practice properly in the given laboratory time
2	3-d software (catia/solid works/unigraphics/delcam/ etc)	1	0	1	1.00	Software's are required for improved practical teaching and understanding of students
3	Cam software (master cam/delcam/etc.)	1	0	1	1.00	
<b>Electronics Engineering Laboratory</b>						
1	D.C. Power supply	6	0	6	2.00	These items are needed to conduct practical sessions, so for most of the laboratory equipment is not available for the said laboratory
2	Multi-meters	10	0	20	0.40	
3	Clip on Meter	-	0	05	0.30	
4	Cathode ray oscilloscopes (Dual Channel)	5	1	10	8.00	
5	Digital Voltmeter (0-100mV)	-	0	10	0.40	
6	Digital Ammeter (0-20mA)	-	0	10	0.40	
7	Digital Ammeter (0-100mA)	-	0	10	0.40	
8	Various transducers	10 each	0	10	1.00	
9	Microprocessor kits – 8085	10	0	10	1.50	
10	Micro controller kits 8051, 89c52	4	0	4	0.80	
11	DAC AND ADC	4 each	0	4	0.40	
12	Air-conditioner	3	0	3	1.20	Computers are required to interface the microcontrollers and microprocessors and air conditioner to maintain proper temperature for the processor and controllers to work properly
13	Computer	5	0	5	1.70	
14	Instrumentation lab tutorial console	1	0	1	6.50	For conducting practical examination
<b>Electrical Engg. Laboratory</b>						
15	Single Phase transformers	Four	0	4	0.50	These items are required for complete establishment of electrical engineering labroatory and are minimum
16	DC series motor	One				
17	Energy meter	2				
18	Resistive load box	2	0	2	1.00	
19	DC series Generator (with DC drive)	1				
20	DC shunt motor	1	0	1	1.00	
21	Three phase Induction motor	1	0	1	1.00	

	(complete set)					requirements as per FDC report too.
22	Single Phase induction motor	1	0	1	1.00	These items are required for complete establishment of electrical engineering laboratory and are minimum requirements as per FDC report too
23	Slip Ring Induction motor ( Three phase )	1	0	1	1.00	
24	Tachometer	5	0	5	0.50	
25	Digital multi-meters	5	0	5	0.50	
26	Digital Power factor meter	2	0	2	0.20	
27	Wattmeters of various ratings (5A, 10A, 20A, 40A)	2 each	0	2each	0.50	
28	Ammeter (Analog type) (0-10A)	5	0	5	0.20	
29	Voltmeter (Analog type) (0-300V)	5	0	5	0.20	
30	Rheostats of various ratings (2.5A, 5A,10A)	2 each	0	2each	0.20	
31	Variac single phase or Dimmer Set (0-250V)	2	0	2	0.60	
32	Three phase Dimmer Set	2	0	2	1.00	
<b>Total(Computer Science &amp; Electrical Engg.)</b>					<b>40.00</b>	

**APPENDIX-II**

S.no	Proposal of new instruments to be purchased	Minimum quantity required in the laboratory concerned	Available quantity in the lab concerned	Quantity required to be purchased	Approximate cost (Rs lacs)	Justification/Remarks
<b>B) Mechanical engineering</b>						
<b>Workshop</b>						
1	Bend saw (small)	1	0	1	1.00	These items are required to be added to strengthen workshop
2	Power hammer	1	0	1	2.00	
3	Work bench	4	0	4	1.00	
4	Fitter's table	4	0	4	1.00	
5	Surface plate	2	0	2	4.00	
6	Resistance welding machine	1	0	1	3.00	
7	Cupola (small size)	1	0	1	5.00	
8	Crucibles	2	0	2	2.00	
9	Universal milling machine	1	0	1	7.00	
10	Radial drilling machine	1	0	1	8.00	
<b>Refrigeration and air conditioning lab</b>						
1	Set up for determination of the coefficient of performance of vapour absorption (electrolux) refrigeration system	1	0	1	4.00	Items required for practical purpose
2	Set up for determination of humidifying efficiency	1	0	1	3.00	
<b>Total(Mechanical Engg.)</b>					<b>40.00</b>	
<b>C) Physics lab</b>						
<b>Physics lab</b>						
1	Electrical vibrator, sonometer	1	0	1 each	0.2	Items required to conduct practical's and proposed by FDC to be included in the laboratory
2	Carvey foster bridge set up	1	0	1 each	0.2	
3	Current carrying coil set up	1	0	1 each	0.4	
4	Energy band gap in a semiconductor using a pn junction code	1	0	1 each	0.2	
5	Optical fibre kit :	1	0	1 each	0.4	



6	To find the wave length of light by prism model- nvis 6110	1	0	1 each	0.3	
7	Ultrasonic measurement tracer	1	0	1 each	0.6	
8	Fiber optic analog and digital	1	0	1 each	0.4	
9	Thermoelectric effect apparatus (make- mittal)	1	0	1 each	0.4	
<b>D) Chemistry Lab</b>						
1	Polarimeter	1	0		1.00	For Practical Experiments
2	Fuel properties measuring apparatus : bomb calorimeter, gas calorimeter, flash and fire point apparatus, cloud point apparatus, etc	1 each	0		0.90	
<b>Total (Physics &amp; Chemistry)</b>					<b>5.00</b>	
<b>E) Other Laboratories</b>						
Development of communications laboratory					<b>20.00</b>	Language Lab is required to improve the students, listening, reading and speaking skills which required a software and computers setup

**Total Non-Recurring Equipment for the Laboratory Requirement (A+B+C+D+E) = 40.00+40.00+5.00+20.00 = 105.00 Laes**

**APPENDIX – III (CIVIL WORKS)**

Name of the Scheme	Construction Name	Size	Quantity	Place	Approximate Cost
Establishment of Department of Basic Engineering and Applied Sciences	Professor Room	15' * 20'	1	College of Agricultural Engineering & Technology, Godhra	6.00
	Associate Professor Room	10' * 15'	3		9.00
	Assistant Professor Room	10' * 12'	9		21.00
	Electrical Engg. Lab	20' * 30'	1		12.00
	Electronics Lab	20' * 30'	1		12.00
	Applied Instrumentation & Neural Network Laboratory	20' * 30'	1		12.00
	Refrigeration and Air-conditioning Laboratory	20' * 30'	1		12.00
	Soil Mechanics and Strength of Materials	20' * 30'	1		12.00
	Language Laboratory	20' * 30'	1		12.00
	Surveying & Leveling Laboratory	20' * 30'	1		12.00
<b>Total Amount :</b>					<b>120.00</b>



## Annexure - II

### PROPOSAL SUBMITTED FOR ESTABLISHING THE IRRIGATION AND DRAINAGE ENGINEERING DEPARTMENT, CAET, GODHRA

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Title of the Scheme	: Establishing the Irrigation and Drainage Engineering Department, CAET, Godhra
Principal Investigator	: Professor & Head
Whether the scheme is spill over/expansion or new scheme	: New Scheme
Type of scheme	: Plan Scheme
Year of Starting	: 2017-2022 (5 years)
Background information/justification of the scheme	<p>: Irrigated agriculture contributes to about 40 percent of the global food production from an estimated 20 percent of agricultural land, or about 300 million hectares globally. It also has a very long historical tradition of irrigated crops. Some of the Indian irrigation systems are more than ten centuries old. India has the largest irrigated area in the world. Irrigated farmland typically generates three times the production of an equivalent area farmed under dry-land systems. Lessons from the past and from the new modernised irrigation and drainage networks in India need to be analysed and shared with the newly emerging communities of enlightened and empowered organised irrigators.</p> <p>As India's population grows and nears 1.6 billion by 2050 (present about 1.28 billion), rapid urbanization, industrialization and pollution of water sources will put pressure on limited and scarce water resources. India faces a daunting task of feeding population requiring about 380 metric tons (MT) food grains as against the present food production of about 260 MT.</p> <p>The irrigation sector, which presently withdraws a major share of freshwater (about 80 percent), is expected to face a stiff competition from other sectors like domestic industries, environment etc. and its share is likely to reduce to 68% by 2050. Under finite land and water resources, increased agricultural production will have to come from the limited net sown area by increasing productivity with an optimal use of available water resources. Degraded and waterlogged areas have the potential to further improve the crop production and productivity with improved irrigation methodologies along with suitable drainage facilities. In order to achieve this target, an improved irrigation management, drainage technologies and agronomical practices will be required.</p> <p>Keeping this in view the department will generate skilled manpower in the field of irrigation and drainage engineering to cater the needs of farmers, field engineers.</p>

	<p>industry as well as institutes by initiating B. Tech., M. Tech and Ph. D Programs</p> <p>In this regard the Fifth Dean Committee clearly spelled the manpower requirement as well as infrastructural facilities to be needed towards this end. The same guidelines are duplicated as it is in this strengthening program also.</p>
Objectives:	<p>: 1.To institute and strengthen technical capabilities to meet the location specific needs towards irrigation technologies and managerial skills required for improving water use efficiency for integrated management of natural resources.</p> <p>2.To carry out region-specific R &amp; D and wider trainings for trainers and field functionaries of line departments on irrigation management (surface, sprinkler, and drip irrigation engineering) and other aspects related to irrigation engineering suitable for the region.</p> <p>3.To develop need based low cost technologies for water use efficiency for on farm irrigation and groundwater and canal irrigation engineering.</p> <p>4.To facilitate updated R &amp; D components in regular academic (U.G and P. G.) programs of newly establish faculty of agricultural engineering.</p> <p>5.To impart training to rural youths, farmers and women for popularization and better adoption of above technologies for achieving enhanced productivity, developing entrepreneurship skills and improving livelihoods of farmers.</p>
Infrastructural requirement	<p>: Expansion of the department above the existing departmental building including:</p> <p>Staff seating arrangement and High Tech Classrooms with furniture and fixtures :50 lakhs</p> <p>Different Laboratory :50</p> <hr/> <p>Totals Cost : 100 lakhs</p>
Equipment required (non recurring)	<p>: 9.8 lakhs (details attached)</p>
Human resource need	<p>: To operate the department independently to produce the high skilled irrigation and drainage engineers for society and to generate self employment in the field of irrigation and drainage engineering staff will be required (details attached). The 5<sup>th</sup> Dean Committee constituted by Indian Council of Agricultural Research, New Delhi to decide manpower requirement, infrastructural facilities and other for meeting the qualitative standards of the education across the country. The minimum standards to maintain uniformity among different colleges in the country were suggested by ICAR. New Delhi. The same standards suggested were adopted in the college into to.</p>

**First five year: Pay and Allowances of staff**

Sr. No.	Name of the Post	Recommended number of Posts	Pay scale	Pay and Allowances, Rs in lakhs					Total
				I	II	III	IV	V	
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2	Associate Professors	2	37400-67000	30.0	33.0	36.9	39.9	43.9	183.7
3	Assistant Professors	3	15600-39100	21.0	23.1	25.4	28.0	30.7	128.2
<b>Office Staff</b>									
4	Clerk,	1	9300-34800	4.5	5.0	5.3	5.8	6.3	26.9
5	PA/Steno	1	9300-34800	4.3	4.7	5.0	5.8	6.3	26.1
6	Messenger/Peon	1	4440-7440	2.0	2.3	2.6	2.8	3.0	12.7
<b>Laboratory staff</b>									
7	Laboratory Assistant	2	5200-20200	5.0	5.5	6.1	6.7	7.3	30.6
8	Workshop Staff/ Computer operator/ Driver /Technicians, Nos. 3	3	9300-34800	13.0	14.3	15.6	17.0	18.7	78.6
<b>Total Posts</b>		<b>14</b>		<b>94.8</b>	<b>104.4</b>	<b>114.9</b>	<b>126</b>	<b>138.2</b>	<b>578.3</b>

**Costing of Infrastructure and other Items for support:**

( Rs. in Lakhs )

Sr. No.	Component	Years (Rs in lakhs)					Total
		I	II	III	IV	V	
1	Pay & allowances of staff (Professor, Asso. Prof., Asstt. Prof, Admin. And technical Staff)	94.8	104.4	114.9	126	138.2	578.3
2	Recurring Contingency	8.0	9.0	10.0	11.0	12.0	50
3	Non- Recurring (As per attached list)	9.8	-	-	-	-	9.8
4	Civil Works	50	30	20	-	-	100
<b>Total estimated Expenditure (Rs in Lakhs)</b>		<b>162.6</b>	<b>143.4</b>	<b>144.9</b>	<b>137</b>	<b>150.2</b>	<b>738.1</b>

**Man Power required as per 5<sup>th</sup> Deans' Committee Recommendation**

Faculty	Staff requirement as per 5 <sup>th</sup> Dean recommendation	Present staff status in the department	Required staff
Professor	1	0	1
Associate Professors	2	0	2
Assistant Professors	3	0	3
Placement Officer	-	-	-
Office Staff			
AO/Suptd.	-	-	-
Clerk	1	0	1
PA/Steno	1	0	1
Messenger/Peon	1	0	1
Laboratory staff			
Laboratory Assistant	2	0	2
Workshop Staff/ Computer operator/ Driver/Technicians	3	0	3
<b>Total</b>	<b>14</b>	<b>0</b>	<b>14</b>

**Detailed list of instruments/equipments proposed and required for scheme based on the 5<sup>th</sup> Dean Committee**

S. No.	Name of Equipment	Quantity	Approx Cost. (Lakhs)
1	Darcy Apparatus	4	4.0
2	Porous cup & Measuring Flask	1	0.4
3	Positive displacement pump (Hand Pump)	5	2.0
4	Tachometer	1	0.4
5	Pump Testing Rig	2	1.5
<b>Field Lab</b>			
1	Diesel Engine with Centrifugal Pump	1	1.5
<b>Total</b>			<b>9.8</b>