

## 2.2.1 The institution assesses the learning levels of the students and organizes special Programmes for advanced learners and slow learners

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# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

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## DEPARTMENT OF SCIENCE AND HUMANITIES ACADEMIC YEAR: 2022 – 2023 FIRST YEAR - ODD SEM

### BRIDGE COURSE TIME TABLE

Date : 07.11.2022 - 09.11.2022

DEPT/SEC : CSE - A

Staff Incharge

1. Mr.K.Ramamoorthy, AP/Maths
2. Mrs.Viswaja, AP/CSE

Day / Period	8.30 AM TO 10.30 AM	B R E A K	11.00 AM TO 1.00 PM
MON	PYTHON		MATHS
TUE	MATHS		PYTHON
WED	MATHS		PYTHON

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Prepared by

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**ACADEMIC YEAR: 2022 – 2023**

**FIRST YEAR - ODD SEM**

**BRIDGE COURSE TIME TABLE**

**Date : 07.11.2022 - 09.11.2022**

**DEPT/SEC: IT - B**

Staff Incharge

1. Mrs.S.Sudha, AP/Maths
2. Mr.A.Pandian, AP/CSE

Day / Period	8.30 AM TO 10.30 AM	B R E A K	11.00 AM TO 1.00 PM
MON	PYTHON		MATHS
TUE	MATHS		PYTHON
WED	MATHS		PYTHON

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5.11.22  
Approved by

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**DEPARTMENT OF SCIENCE AND HUMANITIES**  
**ACADEMIC YEAR: 2022 – 2023**  
**FIRST YEAR - ODD SEM**

**BRIDGE COURSE TIME TABLE**  
**Date : 07.11.2022 - 09.11.2022**

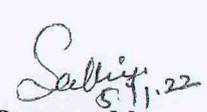
**DEPT/SEC: AIDS & CSBS - C**

Staff Incharge

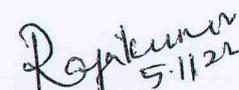
1. Mrs.D.Vimala, AP/Maths
2. Mr.Weslin, AP/CSE

Day / Period	8.30 AM TO 10.30 AM	B R E A K	11.00 AM TO 1.00 PM
MON	MATHS		PYTHON
TUE	PYTHON		MATHS
WED	MATHS		PYTHON

  
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**ACADEMIC YEAR: 2022 – 2023**

**FIRST YEAR - ODD SEM**

**BRIDGE COURSE TIME TABLE**

**Date : 07.11.2022 - 09.11.2022**

**DEPT/SEC : ECE - D**

Staff Incharge

1. Mr.S.Rajakumar, AP/Maths
2. Mrs.Aishwarya, AP/CSE

Day / Period	8.30 AM TO 10.30 AM	B R E A K	11.00 AM TO 1.00 PM
MON	MATHS		PYTHON
TUE	PYTHON		MATHS
WED	MATHS		PYTHON

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ACADEMIC YEAR: 2022 – 2023

FIRST YEAR - ODD SEM

### BRIDGE COURSE TIME TABLE

Date : 07.11.2022 - 09.11.2022

DEPT/SEC : CIVIL/MECH/EEE - E

Staff Incharge

1. Mrs.N.Sathya, AP/Maths
2. Mrs.Gayathiri, AP/CSE

Day / Period	8.30 AM TO 10.30 AM	B R E A K	11.00 AM TO 1.00 PM
MON	MATHS		PYTHON
TUE	PYTHON		MATHS
WED	MATHS		PYTHON

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SYLLABUS FOR BRIDGE COURSE  
IN  
MATHS  
2022-2023



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**Module-2****Differential and Integral Calculus****Lectures required-02**

A fundamental concept in single variable calculus is the concept of the limit of a function. In this module, we first introduce the definition of limit and discuss some of its properties. After that we introduce the notion of continuity of a function and the concept of the derivative of a function, and their properties. Also we discuss some of the results related to continuity and differentiability. We begin this module with some preliminary concepts.

**Intervals:** A subset 'A' of  $\mathbb{R}$  is called an interval if 'A' contains every element lies between any two members of 'A'.

i.e. whenever  $a \leq c \leq b$  , where  $a, b \in A$

$$\Rightarrow c \in A$$

**Open Interval:**  $(a, b) = \{x \in \mathbb{R} / a < x < b\}$

**Neighbourhood of a point:**

A set  $N \subseteq \mathbb{R}$  is called the neighbourhood of a point  $a \in \mathbb{R}$ , if there exists an open interval I containing  $a$  and contained in  $N$ , i.e.  $a \in I \subseteq N$ .

**Function:**

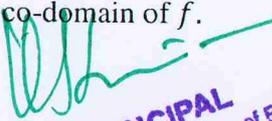
Let  $A$  and  $B$  be two non-empty sets. A Function  $f$  from  $A$  to  $B$  is a rule of correspondence that assigns to each element  $x$  in  $A$ , a unique  $y$  in  $B$ .

$A$  is said to be the domain of  $f$  and  $B$ , the co-domain of  $f$ .

**Examples:**

- (1) The set  $\mathbb{R}$  of real numbers is the neighbourhood of each of its points.  
 $\therefore \forall x \in \mathbb{R} , \exists$  an open interval  $(x - \epsilon , x + \epsilon) \subseteq \mathbb{R}$ .
- (2)  $\mathbb{N}, \mathbb{Z}, \mathbb{Q}, \mathbb{Q}^c$  are not the nbd of any of its points (since these sets do not contain any open interval)
- (3)  $S = \left\{ \frac{1}{n} \mid n \in \mathbb{N} \right\}$  is not nbd of any real no.

**Limit point of a Set:** Let  $S \subseteq \mathbb{R}$  and  $\alpha \in \mathbb{R}$  then  $\alpha$  is called a limit point of  $S$  if or any  $\delta > 0$

  
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$$(\alpha - \delta, \alpha + \delta) \cap S - \{\alpha\} \neq \emptyset$$

i.e. every nbd of  $\alpha$  Contains at least one element of  $S$  other than  $\alpha$ .

**Note:**

- (1) A limit point of a set may or may not be a member of the set.
- (2)  $\alpha \in \mathbb{R}$  is limit point of  $S \subseteq \mathbb{R}$  if every nbd of  $\alpha$  contains infinite elements of  $S$ .

**Example:** The set  $S = \mathbb{N}$ (Natural Number) has no limit point.

$\because$  for any  $\alpha \in \mathbb{R}$ , any  $\delta > 0$

$$(\alpha - \delta, \alpha + \delta) \cap S \text{ if finite.}$$

$\Rightarrow \alpha$  is not a limit point  $\mathbb{N}$

Here  $\alpha$  is arbitrary  $\Rightarrow \mathbb{N}$  is no limit pt.

**Example:** The set  $\{\frac{1}{n} / n \in \mathbb{N}\}$  has only one limit point, zero, which is not a member of the set.

### Limits

**Limit of a function:** Let  $f(x)$  be defined on an open interval about  $x_0$  except possibly at  $x_0$  itself. We say that limit of  $f(x)$  as  $x$  approaches  $x_0$  is the number  $L$  if for every number  $\epsilon > 0$ , there exist a corresponding number  $\delta > 0$ , s. t. for all  $x$ ,

$$0 < |x - x_0| < \delta \Rightarrow |f(x) - L| < \epsilon$$

**OR:**

**Definition-2:** Let  $A \subseteq \mathbb{R}$ , and let  $C$  be a limit point of  $A$  for a function  $f: A \rightarrow \mathbb{R}$ , a real no.  $L$  is said to be a limit of  $f$  at  $C$  if, given any  $\epsilon > 0$  there exists a  $\delta > 0$  such that if  $x \in A$  and

$$0 < |x - c| < \delta, \text{ then } |f(x) - L| < \epsilon.$$

**Remarks:**

- (a): The inequality  $0 < |x - c|$  is equivalent to saying  $x \neq c$ .
- (b): Since the value of  $\delta$  usually depends on  $\epsilon$ , we will sometimes write  $\delta(\epsilon)$  instead of  $\delta$ .

**Question:** Show that a function cannot have two different limits at the same point. That is, if  $\lim_{x \rightarrow x_0} f(x) = L_1$  and  $\lim_{x \rightarrow x_0} f(x) = L_2$  then  $L_1 = L_2$ .

**Solution:** Let, if possible,  $f(x)$  tend to limits  $L_1$  and  $L_2$  here for any  $\epsilon > 0$ , it is possible to choose a  $\delta > 0$  such that

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$$|f(x) - L_1| < \frac{\epsilon}{2} \quad \text{when} \quad 0 < |x - x_0| < \delta$$

$$|f(x) - L_2| < \frac{\epsilon}{2} \quad \text{when} \quad 0 < |x - x_0| < \delta$$

$$\begin{aligned} \text{Now, } |L_1 - L_2| &= |L_1 - f(x) + f(x) - L_2| \\ &\leq |L_1 - f(x)| + |f(x) - L_2| \\ &< \frac{\epsilon}{2} + \frac{\epsilon}{2} = \epsilon \quad \text{when} \quad 0 < |x - x_0| < \delta \end{aligned}$$

i.e.  $|L_1 - L_2|$  is less than any positive number  $\epsilon$  (however small) and so must be equal to zero.

Thus  $L_1 = L_2$ .

**Question:** Show that:  $\lim_{x \rightarrow c} f(x) = c^2$  if  $f(x) = \begin{cases} x^2, & x \neq c \\ 1, & x = c \end{cases}$

**Solution:** We want to make the difference  $|x^2 - c^2|$  less than a reassigned  $\epsilon > 0$  by taking  $x$  sufficiently close to  $c$ . To do so, we note that

$$x^2 - c^2 = (x + c)(x - c). \text{ Moreover, if } |x - c| < 1 \text{ then}$$

$$|x| < |c| + 1, \text{ so that}$$

$$|x + c| \leq |x| < |c| + 1 < 2|c| + 1.$$

Therefore, if  $|x - c| < 1$ , we have

$$|x^2 - c^2| = |x + c| \cdot |x - c| < (2|c| + 1) \cdot |x - c| \tag{1}$$

Moreover this last term will be less than  $\epsilon$  provide we take  $|x - c| < \epsilon / (2|c| + 1)$

Consequently, if we choose

$$\delta(\epsilon) = \inf \left\{ 1, \frac{\epsilon}{2|c| + 1} \right\}$$

Then if  $0 < |x - c| < \delta(\epsilon)$ , it will follow first that  $|x - c| < 1$  so that (1) is valid, and therefore since  $|x - c| < \epsilon / (2|c| + 1)$  that  $|x^2 - c^2| < (2|c| + 1) \cdot \epsilon / (2|c| + 1) = \epsilon$ .

Since we have a way of choosing  $\delta(\epsilon)$  for an arbitrary choice of  $\epsilon > 0$ , we infer that

$$\lim_{x \rightarrow c} f(x) = c^2$$

**Exercise:** Prove the limit statement  $\lim_{x \rightarrow -2} f(x) = 4$  if  $f(x) = \begin{cases} x^2, & x \neq -2 \\ 1, & x = -2 \end{cases}$

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**Question:** Let  $f(x) = \begin{cases} 0, & \text{if } x \text{ is rational} \\ 1, & \text{if } x \text{ is irrational} \end{cases}$

Use definition of limit to prove that  $\lim_{x \rightarrow 0} f(x)$  does not exist.

**Solution:** Let  $L \in \mathbb{R}$

**Case-I:**  $L = 0$

$$\text{Let } \epsilon = \frac{1}{2}$$

$$\forall \delta > 0, \exists x \in Q' \text{ Such that } |x - 0| < \delta \quad (\because Q' \text{ is dense in } \mathbb{R})$$

$$\therefore f(x) = 1$$

$$|f(x) - L| = |1 - 0| = 1 \geq \frac{1}{2}$$

$$\therefore \exists \epsilon > 0, \text{ namely } \frac{1}{2} \text{ s.t. } \forall \delta > 0, \exists x \text{ s.t. } |x - 0| < \delta \text{ and } |f(x) - 0| \geq \epsilon$$

$$\therefore \lim_{x \rightarrow 0} f(x) \neq 0$$

**Case-II:**  $L \neq 0$

$$\text{Let } \epsilon = |L|/2 > 0$$

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**Module-2****Pretest on Differential and Integral Calculus**

**Q. 1.** If  $f$  has a derivative at  $x=c$ , show that  $f$  is continuous at  $x=c$ .

**Q. 2.** The function,

$$f(x) = \begin{cases} 1, & \text{if } x \text{ is rational} \\ 0, & \text{if } x \text{ is irrational} \end{cases}$$

is discontinuous at ...

**Q. 3.** The function

$$f(x) = \begin{cases} x \sin\left(\frac{1}{x}\right), & \text{if } x \neq 0 \\ 0, & \text{if } x = 0 \end{cases}$$

is differentiable at  $x=0$  or not? Give reason for your answer.

**Q. 4.** Evaluate

$$\lim_{x \rightarrow 0} \left( \frac{x e^x - \log(1+x)}{x^2} \right)$$

**Q. 5.** If  $f(x)$  and  $g(x)$  are continuous for  $0 \leq x \leq 1$ , could  $f(x)/g(x)$  possibly be discontinuous at a point of  $[0, 1]$ ? Give reason for your answer.

**Q. 6.** Give an example of function  $f$  and  $g$ , both continuous at  $x=0$ , for which the composite  $f \circ g$  is discontinuous at  $x=0$ .

**Q. 7.** Suppose that  $h$  is integrable and  $\int_{-1}^1 h(r) dr = 0$  and  $\int_{-1}^3 h(r) dr = 6$ . Find  $\int_3^1 h(r) dr = ?$

**Q. 8.** For what values of  $c$  the following function

$$f(x) = \begin{cases} \frac{x^2 - 4}{x - 2}, & \text{if } x < 2; \\ (c^2 - c)x - 8, & \text{if } x \geq 2 \end{cases}$$

is continuous everywhere?

  
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**Q. 9.** The expression  $\frac{1}{50} \left( \sqrt{\frac{1}{50}} + \sqrt{\frac{2}{50}} + \dots + \sqrt{\frac{50}{50}} \right)$  is a Riemann sum approximation for .....

(a)  $\int_0^1 \sqrt{\frac{x}{50}} dx$     (b)  $\int_0^1 \sqrt{x} dx$     (c)  $\frac{1}{50} \int_0^1 \sqrt{\frac{x}{50}} dx$     (d)  $\frac{1}{50} \int_0^1 \sqrt{x} dx$     (e)  $\frac{1}{50} \int_0^{50} \sqrt{x} dx$

## Continuity

**Definition:** Let  $A \subseteq \mathbb{R}$ , Let  $f: A \rightarrow \mathbb{R}$ , and let  $a \in A$ . We say that  $f$  is continuous at  $a$  if

$$\lim_{x \rightarrow a} f(x) = f(a)$$

In other words, the function is continuous at ' $a$ ', if for each  $\epsilon > 0$ ,  $\exists \delta > 0$  s.t.  $|f(x) - f(a)| < \epsilon$ , when  $|x - a| < \delta$ .

**Discontinuous functions:** A function is said to be discontinuous at a point  $c$  of its domain if it is not continuous there at. The point  $c$  is then called a point of discontinuity of the function.

### Types of discontinuities:

- (i) A function is said to have a removable discontinuity at  $x = c$  if  $\lim_{x \rightarrow c} f(x)$  exists but is not equal to the value  $f(c)$ .
- (ii)  $f$  is said to have a discontinuity of the first kind at  $x = c$  if  $\lim_{x \rightarrow c^-} f(x)$  and  $\lim_{x \rightarrow c^+} f(x)$  both exist but are not equal.
- (iii)  $f$  is said to have a discontinuity of the second kind at  $x = c$  if neither  $\lim_{x \rightarrow c^-} f(x)$  nor  $\lim_{x \rightarrow c^+} f(x)$  exists.

**Question:** Suppose that  $f$  is continuous at  $x_0$  and  $f(x_0) > 0$ . Prove that there exists an open interval containing  $x_0$  on which  $f(x) > 0$

**Solution:** Since  $f$  is continuous at  $x_0$ ,

$$\lim_{x \rightarrow x_0} f(x) = f(x_0)$$

$$\therefore \text{for } \epsilon = f(x_0) > 0, \exists \delta > 0 \text{ s.t.}$$

$$\therefore |x - x_0| < \delta \Rightarrow |f(x) - f(x_0)| < f(x_0)$$

$$= f(x_0) - f(x_0) < f(x) < f(x_0) + f(x_0)$$

$$= f(x) > 0$$

$$\therefore \text{for } x \in (x_0 - \delta, x_0 + \delta), f(x) > 0.$$

  
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**Question:** Show that if  $f(x)$  is continuous at  $x = c$ , then so is  $|f(x)|$ . Is the converse true?

**Solution:** Let  $f(x)$  be continuous at  $x = c$

$$\text{i.e. } \lim_{x \rightarrow c} f(x) = f(c)$$

i.e.  $\forall \epsilon > 0, \exists \delta > 0$  s.t.

$$|x - x_0| < \delta \Rightarrow |f(x) - f(c)| < \epsilon \quad \forall x$$

$$\Rightarrow ||f(x) - f(c)|| < |f(x) - f(c)| < \epsilon$$

(by triangular inequality)

i.e.  $\forall \epsilon > 0, \exists \delta > 0$  s.t.

$$|x - x_0| < \delta \Rightarrow ||f(x) - f(c)|| < \epsilon \quad \forall x$$

$$\text{i.e. } \lim_{x \rightarrow c} |f(x)| = |f(c)|$$

$\therefore |f(x)|$  is continuous at  $x = c$ .

**The Converse is not true.**

i.e.  $|f(x)|$  is continuous at  $x = c \not\Rightarrow f(x)$  is continuous at  $x = c$

e.g. Consider,  $f(x) = \begin{cases} 1, & x \leq 2 \\ -1, & x > 2 \end{cases}$

$$\therefore |f(x)| = 1$$

$|f(x)|$  is a constant function  $\Rightarrow$  Continuous of  $x = 2$

$$\text{But } \lim_{x \rightarrow 2} f(x) \neq f(2) = 1$$

$\therefore$  for  $\epsilon = 1 > 0$

$$\forall \delta > 0, \exists x > 2 \text{ s.t. } |x - x_0| < \delta$$

$$\therefore |f(x) - 1| = |-1 - 1| = 2 > \epsilon$$

$$\therefore \exists \epsilon > 0 \text{ s.t. } \forall \delta > 0 \exists x \text{ s.t. } |x - x_0| < \delta \text{ and } |f(x) - 1| \geq \epsilon$$

$$\therefore \lim_{x \rightarrow 2} f(x) \neq 1$$

So,  $f(x)$  is not continuous at  $x = 2$

**Question:** Let  $f(x) = \begin{cases} x, & \text{if } x \text{ is rational} \\ 0, & \text{if } x \text{ is irrational} \end{cases}$

- Show that  $f$  is continuous at  $x = 0$ .
- Show that  $f$  is not continuous at every non-zero value of  $x$ .

**Solution:**

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a)  $f(0) = 0$

To show:  $\lim_{x \rightarrow 0} f(x) = 0$

Let  $\epsilon > 0$  be given.

$$|f(x) - 0| < \epsilon \Rightarrow \begin{cases} |x - 0| < \epsilon, & \text{if } x \text{ is rational} \\ 0 < \epsilon, & \text{if } x \text{ is irrational} \end{cases}$$

Choosing  $\delta = \epsilon$ ,

$$|x - 0| < \delta, \quad |x - 0| < \epsilon,$$

$$|x - 0| < \delta \implies |x - 0| < \epsilon$$

$$|x - 0| < \delta \Rightarrow \begin{cases} |x - 0| < \epsilon, & \text{if } x \text{ is rational} \\ 0 < \epsilon, & \text{if } x \text{ is irrational} \end{cases}$$

$$\Rightarrow |f(x) - 0| < \epsilon$$

$$\therefore \lim_{x \rightarrow 0} f(x) = 0$$

$\therefore f$  is continuous at  $x = 0$ .

Let  $x_0 \neq 0$

To show:  $f$  is not continuous at  $x = x_0$ .

$$\text{Let if possible, } \lim_{x \rightarrow x_0} f(x) = f(x_0)$$

**Case-1:  $x_0 \in Q$ :**

$$\because x_0 \in Q \Rightarrow f(x_0) = x_0 \neq 0$$

$$\text{for } \epsilon = \frac{f(x_0)}{2}$$

$\exists \delta$  s. t.  $|x - x_0| < \delta \Rightarrow |f(x) - f(x_0)| < \epsilon$  (exists because of denseness of  $Q$  in  $\mathbb{R}$ )

For  $x \in Q'$  s. t.  $|x - x_0| < \delta$

$$|f(x) - f(x_0)| = |0 - f(x_0)| = |f(x_0)| < \frac{f(x_0)}{2}$$

which is a contradiction

$$\therefore \lim_{x \rightarrow x_0} f(x) \neq f(x_0)$$

**Case-2:  $x_0 \in Q'$ :**

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$$\therefore f(x) = 0$$

$$\text{for } \epsilon = \frac{|x_0|}{2} > 0$$

$$\exists \delta_1 \text{ s. t. } |x - x_0| < \delta_1 \Rightarrow |f(x) - 0| < \epsilon$$

$$\text{Let } \delta = \min \{ \delta_1, \epsilon \}$$

$$\therefore |x - x_0| < \delta \Rightarrow |f(x) - L| < \epsilon$$

$$\text{for } x \in Q \text{ s. t. } |x - x_0| < \delta$$

$$|x - 0| < \frac{|x_0|}{2} \Rightarrow |x| < \frac{|x_0|}{2} \tag{i}$$

$$\text{Further, } ||x| - |x_0|| < |x - x_0| < \delta < \epsilon$$

$$\therefore ||x| - |x_0|| < \frac{|x_0|}{2}$$

$$\therefore |x| - \frac{|x_0|}{2} < |x| < |x_0| + \frac{|x_0|}{2}$$

$$\therefore |x| > \frac{|x_0|}{2} \tag{ii}$$

$$\text{by (i) \& (ii), } |x| < \frac{|x_0|}{2} \text{ and } |x| > \frac{|x_0|}{2}$$

which is a contradiction.

$$\therefore \lim_{x \rightarrow x_0} f(x) \neq f(x_0)$$

$\therefore f$  is not continuous at  $x \neq 0$

*Wsh*

**Intermediate Value Theorem:** If a function  $f$  is continuous on  $[a, b]$  and  $f(a) \neq f(b)$ , then it assumes every value between  $f(a)$  and  $f(b)$ .

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**Proof:** Let  $A$  be any number between  $f(a)$  &  $f(b)$ . We shall show that  $\exists$  a number  $c \in [a, b]$  s.t.  $f(c) = A$ . Consider a function  $\phi$  defined on  $[a, b]$  s.t.

$$\phi(x) = f(x) - A$$

clearly  $\phi$  is continuous on  $[a, b]$ .

$$\text{also, } \phi(a) = f(a) - A \quad \text{and} \quad \phi(b) = f(b) - A$$

so that  $\phi(a)$  and  $\phi(b)$  are of opposite signs. ( $\because A$  lies between  $f(a)$  &  $f(b)$ )

Thus the function  $\phi$  is continuous on  $[a, b]$  and  $\phi(a)$  &  $\phi(b)$  are of opposite signs therefore,  $\exists c \in (a, b)$  s. t.  $\phi(c) = 0 \Rightarrow f(c) - A = 0 \Rightarrow f(c) = A$ .

## Differentiability

**Definition:** Let  $I \subseteq \mathbb{R}$  be an interval, let  $f: I \rightarrow \mathbb{R}$ , and let  $c \in I$ . We say that a real number  $L$  is the derivative of  $f$  at  $c$  if given any  $\epsilon > 0$ ,  $\exists \delta(\epsilon) > 0$

s.t. if  $x \in I$  satisfies  $0 < |x - c| < \delta(\epsilon)$ , then

$$\left| \frac{f(x) - f(c)}{x - c} - L \right| < \epsilon$$

In this case we say that  $f$  is differentiable at  $c$ , and we write  $f'(c)$  for  $L$ .

In other words, the derivative of  $f$  at  $c$  is given by the limit

$$f'(c) = \lim_{x \rightarrow c} \frac{f(x) - f(c)}{x - c}$$

provided this limits exists.

**Example:** Show that the function  $f(x) = x^2$  is derivable on  $[0, 1]$ .

Let  $x_0$  be any point of  $(0, 1)$  then

$$f'(x_0) = \lim_{x \rightarrow x_0} \frac{x^2 - x_0^2}{x - x_0} = \lim_{x \rightarrow x_0} (x + x_0) = 2x_0 \text{ (exist finitely)}$$

at the end points, we have

$$f'(0) = \lim_{x \rightarrow 0^+} \frac{f(x) - f(0)}{x - 0} = \lim_{x \rightarrow 0^+} \frac{x^2}{x} = \lim_{x \rightarrow 0^+} x = 0 \text{ (exist finitely)}$$

$$f'(1) = \lim_{x \rightarrow 1^-} \frac{f(x) - f(1)}{x - 1} = \lim_{x \rightarrow 1^-} \frac{x^2 - 1}{x - 1} = \lim_{x \rightarrow 1^-} (x + 1) = 2 \text{ (exist finitely)}$$

Thus the function is differentiable in  $[0, 1]$ .

**Example:** A function  $f$  is defined as:

$$f(x) = \begin{cases} x^2 \sin \frac{1}{x}, & \text{if } x \neq 0 \\ 0, & \text{if } x = 0 \end{cases}$$

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is derivable at  $x = 0$  but  $\lim_{x \rightarrow 0} f'(x) \neq f'(0)$

$$\begin{aligned} f'(0) &= \lim_{x \rightarrow 0} \frac{f(x) - f(0)}{x - 0} = \lim_{x \rightarrow 0} \frac{x^2 \sin \frac{1}{x}}{x} \\ &= \lim_{x \rightarrow 0} \frac{x \sin \frac{1}{x}}{1} = 0 \Rightarrow f \text{ is differentiable at } x = 0. \end{aligned}$$

From elementary calculus, we know that for  $x \neq 0$

$$f'(x) = 2x \sin \frac{1}{x} - \cos \frac{1}{x}$$

Clearly,  $\lim_{x \rightarrow 0} f'(x)$  does not exist and therefore, there is no possibility of  $\lim_{x \rightarrow 0} f'(x)$  being equal to  $f'(0)$ .

Thus  $f'(x)$  is not continuous at  $x = 0$  but  $f'(0)$  exists.

**Theorem:** If  $f: I \rightarrow \mathbb{R}$  has a derivative at  $c \in I$ , then  $f$  is continuous at  $c$ .

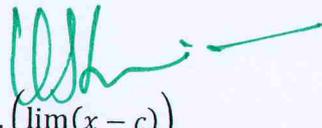
**Proof:** for all  $x \in I$ ,  $x \neq c$ , we have

$$f(x) - f(c) = \left( \frac{f(x) - f(c)}{x - c} \right) (x - c)$$

Since  $f'(c)$  exists, so

$$\begin{aligned} \lim_{x \rightarrow c} (f(x) - f(c)) &= \lim_{x \rightarrow c} \left( \frac{f(x) - f(c)}{x - c} \right) \cdot \left( \lim_{x \rightarrow c} (x - c) \right) \\ &= f'(c) \times 0 \end{aligned}$$

Therefore,  $\lim_{x \rightarrow c} f(x) = f(c)$  so that  $f$  is continuous at  $c$ .

  
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**Rolle's Theorem:** Suppose that  $f$  is continuous on a closed interval  $I = [a, b]$ , that the derivative  $f'$  exists at every point of the open interval  $(a, b)$  and that  $f(a) = f(b)$ . Then  $\exists$  at least one point  $c$  in  $(a, b)$  s. t.  $f'(c) = 0$ .

**OR**

If a function  $f$  defined on  $[a, b]$  is

- (i) Continuous on  $[a, b]$ ,

- (ii) derivable on  $(a, b)$ , and
- (iii)  $f(a) = f(b)$

then  $\exists$  at least one real no.  $c$  between  $a$  &  $b$   $a < c < b$  s. t.  $f'(c) = 0$

**Proof:** Do your-self.

**Lagrange's Mean Value Theorem:**

If a function  $f$  defined on  $[a, b]$  is

- (i) Continuous on  $[a, b]$  and
- (ii) derivable on  $(a, b)$ ,

then  $\exists$  at least one real no.  $c$  between  $a$  and  $b$  ( $c \in (a, b)$ ) s.t.

$$f'(c) = \frac{f(b) - f(a)}{b - a}$$

**Cauchy's Mean Value Theorem:**

If two functions  $f, g$  defined on  $[a, b]$  are

- (i) Continuous on  $[a, b]$
- (ii) derivable on  $(a, b)$ , and
- (iii)  $g'(x) \neq 0, \forall x \in (a, b)$

then  $\exists$  at least one real no.  $c$  between  $a$  &  $b$  s.t.

$$\frac{f(b) - f(a)}{g(b) - g(a)} = \frac{f'(c)}{g'(c)}$$

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**Theorem:** Let  $f: I \rightarrow \mathbb{R}$  be differentiable on the interval  $I$ . Then:

- (a)  $f$  is increasing on  $I$  iff  $f'(x) \geq 0 \quad \forall x \in I$
- (b)  $f$  is decreasing on  $I$  iff  $f'(x) \leq 0 \quad \forall x \in I$

**Theorem:** Let  $I$  be an open interval and let  $f: I \rightarrow \mathbb{R}$  have a second derivative on  $I$ . Then  $f$  is a convex function on  $I$  iff  $f''(x) \geq 0 \quad \forall x \in I$

Assignment

Q.1. Show that

- Interval (Open/closed) is nbd of all of its members except the end points.
- A non-empty finite set is not a nbd of any point.
- Superset of a nbd of a point  $x$  is also a nbd of  $x$ .
- If  $M$  and  $N$  are nbds of a point  $x$ , then that  $M \cap N$  is also a nbd of  $x$ .

Q.2. If a function  $f$  is continuous on a closed interval  $[a, b]$  and  $f(a)$  &  $f(b)$  are of opposite signs ( $f(a) \cdot f(b) < 0$ ), then there exists at least are point  $\alpha \in (a, b)$  s. t.  $f(\alpha) = 0$ .

Q.3. Show that the function defined by

$$f(x) = \begin{cases} x \sin \frac{1}{x}, & \text{when } x \neq 0 \\ 0, & \text{when } x = 0 \end{cases}$$

is continuous at  $x = 0$

Q.4. A function  $f$  is defined on  $\mathbb{R}$  by

$$f(x) = \begin{cases} -x^2 & \text{if } x \leq 0 \\ 5x - 4 & \text{if } 0 < x \leq 1 \\ 4x^2 - 3x & \text{if } 1 < x < 2 \\ 3x + 4 & \text{if } x \geq 2 \end{cases}$$

Examine  $f$  for continuity at  $x = 0, 1, 2$ . Also discuss the kind of discontinuity, if any.

Q.5. Is the function, where  $f(x) = \frac{x-|x|}{x}$  continuous?

Q.6. Show that  $f(x) = |x| + |x - 1|$ ,  $\forall x \in \mathbb{R}$

is continuous but not derivable at  $x = 0$  and  $x = 1$ .

Q.7. Show that

$$f(x) = \begin{cases} x \sin \frac{1}{x}, & \text{if } x \neq 0 \\ 0, & \text{if } x = 0 \end{cases}$$

is continuous but not derivable at the origin.

Q.8. Show that

$$f(x) = \begin{cases} 0, & \text{if } x \leq 0 \\ x, & \text{if } x > 0 \end{cases}$$

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is continuous but not derivable at  $x = 0$ .

**Q.9.** Show that for any real no.  $k$ , the polynomial  $f(x) = x^3 + x + k$  has exactly one real root.

**Q.10.** Verify Rolle's theorem for the function  $f(x) = x^3 - 9x$ .

**Q.11.** Use Intermediate value theorem to show that there is a root of  $\sin x = x^2 - x$  in the interval  $(1, 2)$ .

**References:**

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## Riemann Integrals

The Riemann integral, as it is called today, is the one fundamental topic usually discussed in introductory calculus. In this module, we introduce the concept of Riemann integrals and discuss some of its properties. Throughout this module, it is assumed that we are working with a bounded function  $f$  on a closed interval  $[a, b]$ .

---

**Partition of  $[a, b]$ :** Let  $[a, b]$  be a closed interval and let  $x_0, x_1, \dots, x_n$  are the points of  $[a, b]$  s.t.

$$a = x_0 < x_1 < \dots < x_{n-1} < x_n = b$$

The define a set

$$P = \{a = x_0, x_1, x_2, \dots, x_{r-1}, x_r, \dots, x_n = b\}$$

is called a partition of  $[a, b]$  with  $(n + 1)$  points; and  $I_r = [x_{r-1}, x_r]$  be the  $r^{th}$  sub-interval of  $[a, b]$  obtained by the points  $x_{r-1}$  &  $x_r$  of  $P$ . i. e.

$$I_1 = [x_0, x_1], I_2 = [x_1, x_2], \dots, I_r = [x_{r-1}, x_r], \dots, I_n = [x_{n-1}, x_n]$$

**Length of  $r^{th}$  interval:**  $= l(I_r) = |I_r| = |x_r - x_{r-1}|$

**Norm of Partition:** Let  $P$  be a partition of  $[a, b]$  and  $I_r = [x_{r-1}, x_r]$ , be the  $r^{th}$  sub-interval and  $l(I_r) = \Delta x_r = |x_r - x_{r-1}|$

The norm of  $P$  is denoted by  $\mu(P)$  or  $\|P\|$  and defined as:

$$\|P\| = \text{Max} \{ \Delta x_i \mid i = 1 \text{ to } n \}$$

e.g.  $I = [0, 1]$

Let  $P = \{0 = x_0, x_1, x_2, x_3 = 1\}$

$$= \left\{ 0, \frac{1}{2}, \frac{2}{3}, 1 \right\}$$

$$I_1 = \left[ 0, \frac{1}{2} \right], \quad I_2 = \left[ \frac{1}{2}, \frac{2}{3} \right], \quad I_3 = \left[ \frac{2}{3}, 1 \right]$$

$$l(I_1) = \frac{1}{2}, \quad l(I_2) = \frac{1}{6}, \quad l(I_3) = \left| 1 - \frac{2}{3} \right| = \frac{1}{3}$$

So  $\|P\| = \max \left\{ \frac{1}{2}, \frac{1}{6}, \frac{1}{3} \right\} = \frac{1}{2}$

**Refinement of Partition:** Let  $P$  and  $P^*$  are two partitions of  $[a, b]$  s. t.  $P \subseteq P^*$  then  $P^*$  is called the refinement or finer than  $P$ .

  
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## Module-3

### Matrices and Determinants

#### Lectures required -02

In this module, we discuss about the basics of matrices, types of matrices, operations on matrices, determinants and cofactors, computing inverse of a square matrix, rank and elementary operations with brief discussion on system of linear equations.

#### 1. Matrices and Determinants

- 1.1 Types of Matrices
- 1.2 Operations on Matrices
- 1.3 Determinants and Cofactors
- 1.4 Inverse of a Square Matrix
- 1.5 Rank of Matrix
- 1.6 Elementary row / column operations
- 1.7 System of Linear Equations

#### 1. Matrices and Determinants:

A matrix is defined to be a rectangular array of a number assigned into rows and columns. A set of "mn" elements arranged in rectangular formation containing m-rows and n-columns is called m×n matrix

$$A = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}, \text{ where } a_{ij} \text{ are elements of the matrix } A.$$

#### 1.1 Type of Matrices :

There are around 12 types of matrix.

- i) **Row matrix** : When  $m=1$ , the matrix with one row is called row matrix or vector.
- ii) **Column matrix** : When there is only one column i.e.  $n=1$ , the matrix is called a column matrix.
- iii) **Square matrix** : When  $m=n$ , that is number of rows is equal to number of columns.
- iv) **Triangular Matrix** : In a square matrix, when the elements above the principal diagonal or below the principal diagonal are all zero, the matrix is called triangular matrix.
- v) **Diagonal Matrix** : In a square matrix, when the elements above and below the principal diagonal is zero i.e. matrix is filled with zero elements except on the main diagonal

$$\text{e.g. } \begin{bmatrix} 2 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

- vi) **Scalar matrix** : Scalar matrix is a diagonal matrix in which all the elements along the main diagonal are equal.

$$\text{e.g. } \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$$

- vii) **Unit matrix (Identity Matrix)** : A scalar matrix with all the elements on the diagonal are equal to 1.

$$\text{e.g. } \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

- viii) **Null or Zero Matrix** : If all the elements in matrix are zero, then it is called zero matrix

$$\text{e.g. } \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

- ix) **Symmetric matrix** : A square matrix  $A = (a_{ij})$  is called symmetric matrix if  $a_{ij} = a_{ji}$  for all  $i$  and  $j$ .

$$\text{e.g. } \begin{bmatrix} 2 & 3 & 5 \\ 3 & 6 & -7 \\ 5 & -7 & 4 \end{bmatrix}$$

- x) **Skew symmetric matrix** : A square matrix  $A = (a_{ij})$  is called a skew symmetric if  $a_{ij} = -a_{ji}$  for all  $i$  and  $j$ ,  $i \neq j$  and  $a_{ii} = 0$  for all  $i$ .

$$\text{e.g. } \begin{bmatrix} 0 & 4 & 7 \\ -4 & 0 & -5 \\ -7 & 5 & 0 \end{bmatrix}$$

- xi) **Singular matrix** : If  $|A| = 0$  ( $\det(A)$ ), then the matrix  $A$  is called singular.

- xii) **Non-singular matrix** : If  $|A| \neq 0$ , then the matrix  $A$  is called non-singular.

## 1.2 Operations on Matrices

### (i) Addition of two matrices:

Addition of two matrices  $A = [a_{ij}]_{m \times n}$  and  $B = [b_{ij}]_{m \times n}$  can be defined only when both  $A$  and  $B$  have same more same order.

$$C = [c_{ij}]_{m \times n} (= A + B), \text{ where } c_{ij} = a_{ij} + b_{ij}, 1 \leq i \leq m, 1 \leq j \leq n$$

is the sum of  $A$  and  $B$ .

$$\text{Example: } A = \begin{bmatrix} 2 & 1 & 5 \\ -1 & 6 & 2 \end{bmatrix}, \quad B = \begin{bmatrix} 0 & 5 & -2 \\ 3 & 4 & 1 \end{bmatrix}$$

$$C = A + B = \begin{bmatrix} 2+0 & 1+5 & 5-2 \\ -1+3 & 6+4 & 2+1 \end{bmatrix} = \begin{bmatrix} 2 & 6 & 3 \\ 2 & 10 & 3 \end{bmatrix}$$

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**(ii) Multiplication of matrices by scalar :**

If  $k$  is a real or complex number, and  $A = [a_{ij}]$  is a  $m \times n$  matrix, then the matrix  $B = [b_{ij}]$  where  $b_{ij} = ka_{ij}$  for  $1 \leq i \leq m, 1 \leq j \leq n$  is called a scalar multiplication of  $A$  by  $k$  and written as  $B = kA$ .

e.g. : If  $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$  then  $2A = \begin{bmatrix} 4 & 6 \\ 8 & 10 \end{bmatrix}$

**(iii) Multiplication of two matrices :**

Let  $A = [a_{ij}]_{m \times n}$  and  $B = [b_{ij}]_{r \times s}$  be two matrices. The product  $AB$  is defined only when  $n=r$ , (i.e.) no. of columns of  $A =$  no. of rows of  $B$ .

$C = AB = [c_{ij}]_{m \times s}$  where  $c_{ij} = a_{i1}b_{1j} + a_{i2}b_{2j} + \dots + a_{in}b_{nj} = \sum_{k=1}^n a_{ik} \cdot b_{kj}$ , for  $1 \leq i \leq m, 1 \leq j \leq s$ .

$$A = \begin{bmatrix} 1 & 2 \\ 0 & 5 \end{bmatrix}, \quad B = \begin{bmatrix} 3 & 1 \\ 2 & 7 \end{bmatrix}$$

$$AB = \begin{bmatrix} 1 \times 3 + 2 \times 2 & 1 \times 1 + 2 \times 7 \\ 0 \times 3 + 5 \times 2 & 0 \times 1 + 5 \times 7 \end{bmatrix}$$

$$= \begin{bmatrix} 7 & 15 \\ 10 & 35 \end{bmatrix}$$

Note  $AB \neq BA$

$$BA = \begin{bmatrix} 3 \times 1 + 1 \times 0 & 3 \times 2 + 1 \times 5 \\ 2 \times 1 + 7 \times 0 & 2 \times 2 + 7 \times 5 \end{bmatrix}$$

$$= \begin{bmatrix} 3 & 11 \\ 2 & 39 \end{bmatrix}$$

**(iv) Transpose of matrix :**

If  $A = [a_{ij}]_{m \times n}$ , then the  $n \times m$ -matrix  $B = [b_{ij}]_{n \times m}$  is defined as  $b_{ij} = a_{ji}$ ,  $1 \leq i \leq n, 1 \leq j \leq m$ , is obtained by interchanging the rows and columns is called the transpose of  $A$ , denoted by  $A^T$ .

e.g. : If  $A = \begin{bmatrix} 2 & 3 & 0 \\ 4 & 7 & 5 \end{bmatrix}_{2 \times 3}$ ,  $A^T = \begin{bmatrix} 2 & 4 \\ 3 & 7 \\ 0 & 5 \end{bmatrix}_{3 \times 2}$

**1.3 Determinants and Cofactors**

Let  $A = [a_{ij}]_{m \times n}$  be a square matrix. If we delete the row and column containing the element  $a_{ij}$ , we obtain a square matrix of order  $n-1$ . The determinant of this square matrix of order  $n-1$  is called the Minor of the element  $a_{ij}$  and is denoted by  $M_{ij}$ .

Cofactor  $(a_{ij}) = (-1)^{i+j}M_{ij}$  and is denoted by  $A_{ij}$ . If  $A=[a_{ij}]$  is a square matrix of order  $n$ ,

the matrix  $\begin{bmatrix} A_{11} & A_{21} & \dots & A_{n1} \\ A_{12} & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ \cdot & \cdot & \dots & \cdot \\ A_{1n} & A_{2n} & \dots & A_{nn} \end{bmatrix}$  is called the adjoint of  $A$ , denoted by  $\text{adj}(A)$ .

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**1.4 Inverse of a square matrix :**

A square matrix  $A$  of order  $n$  is said to be invertible, if there exists a square matrix  $B$  of order  $n$  such that  $AB = BA = I_n$  and  $B$  is called the inverse of  $A$  and is denoted by  $A^{-1}$ .

If  $A$  is non-singular square matrix, then  $A^{-1}$  exists and  $A^{-1} = \frac{1}{|A|} \cdot adj(A)$ .

**1.5 Rank of a Matrix :**

Rank of a matrix  $A$  is said to be  $r$ , if  $A$  satisfies the following conditions:

- i) There exists an  $r \times r$  submatrix whose determinant is non-zero.
- ii) The determinant of every  $(r+1) \times (r+1)$  submatrix is zero.

In other words, order of the determinant of the largest submatrix of  $A$  which does not vanish is called the rank of the matrix and is denoted by  $r(A)$ .

Note that  $r(A) \leq \min(m, n)$  where  $A$  is of order  $m \times n$ .

e.g. Find  $r(A)$  using determinants of minors.

$$A = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 1 & 2 \\ -1 & 2 & 2 \end{bmatrix}$$

Since  $A$  is  $3 \times 3$ ,  $r(A) \leq 3$

$$\begin{aligned} |A| &= \begin{vmatrix} 2 & 3 & 4 \\ 3 & 1 & 2 \\ -1 & 2 & 2 \end{vmatrix} \\ &= 2(2-4) - 3(6+2) + 4(6+1) \\ &= 2(-2) - 3(8) + 4(7) \\ &= -4 - 24 + 28 = 0 \end{aligned}$$

$\therefore |A| = 0, r(A) \leq 2.$

Consider the submatrix order  $2 \times 2$  :

$$\begin{vmatrix} 2 & 4 \\ 3 & 2 \end{vmatrix} = 4 - 12 \neq 0.$$

Since determinant of  $2 \times 2$  order matrix is not equal to zero,  $r(A) = 2$

**1.6 Elementary Row(Column) Operations:**

Let  $A$  be an  $m \times n$  order matrix. An elementary row (column) operation on  $A$  is one of the following three types:

- i) Interchange of any two rows(columns) denoted by  $R_i \leftrightarrow R_j$  ( $C_i \leftrightarrow C_j$ ).
- ii) Multiplication of row(column) by a non-zero element  $c$ , denoted by  $R_i \rightarrow cR_i$  ( $C_i \rightarrow cC_i$ ).
- iii) Addition of any multiple of one row(column) with other row  $R_i \rightarrow R_i + kR_j$  ( $C_i \rightarrow C_i + kC_j$ ).

By applying any of these elementary operations, the rank of matrix is not affected. Hence, "By successive application of elementary row and column operations, any non-zero  $m \times n$  matrix  $A$  can be reduced to a diagonal matrix  $D$  in which the diagonal entries are either 0 or 1 and all the 1's precede all the zeros on the diagonal.

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In other words, the non-zero  $m \times n$  matrix is equivalent to a matrix of the form  $\begin{bmatrix} I_r & 0 \\ 0 & 0 \end{bmatrix}$  where  $I_r$  is the  $r \times r$  - identity matrix and 0 is the zero matrix. This is called the canonical form of the matrix.

Two matrices A and B of the same order are said to be equivalent if B can be obtained from A by a finite number of elementary transformation.

**Definition (Rank of a matrix) :**

If A is a  $m \times n$  matrix, then the unique non-negative integer r such that  $A \sim \begin{bmatrix} I_r & 0 \\ 0 & 0 \end{bmatrix}$  is said to be the rank of A. The matrix is called as the canonical form of A.

Example: Find the rank of  $A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 4 & 1 & 0 & 2 \\ 0 & 3 & 4 & 2 \end{bmatrix}$ .

$$A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ 4 & 1 & 0 & 2 \\ 0 & 3 & 4 & 2 \end{bmatrix}$$

A is  $3 \times 4$  matrix.  $\therefore$  Clearly  $r(A) \leq 3$ .

$$\begin{aligned} A &\sim \begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & -3 & -4 & -2 \\ 0 & 3 & 4 & 2 \end{bmatrix} && R_2 \rightarrow R_2 - 4R_1 \\ &\sim \begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & -3 & -4 & -2 \\ 0 & 0 & 0 & 0 \end{bmatrix} && R_3 \rightarrow R_3 + R_2 \\ &\sim \begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & 4/3 & 2/3 \\ 0 & 0 & 0 & 0 \end{bmatrix} && R_2 \rightarrow R_2 / (-3) \\ &\sim \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 4/3 & 2/3 \\ 0 & 0 & 0 & 0 \end{bmatrix} && C_2 \rightarrow C_2 - C_1, C_3 \rightarrow C_3 - C_1, C_4 \rightarrow C_4 - C_1 \\ &\sim \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} && C_3 \rightarrow C_3 - 4/3 C_2, C_4 \rightarrow C_4 - 2/3 C_2 \\ A &\sim \begin{bmatrix} I_r & 0 \\ 0 & 0 \end{bmatrix} && \\ &&& \therefore r(A) = 2. \end{aligned}$$

  
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**1.7 Solving systems of equations**

Given a system of equations of the form  $AX = B$ , where A is an  $m \times n$  coefficient matrix, X -unknown vector of  $(n \times 1)$  order and B-a vector of  $(m \times 1)$  order.

$$A = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \dots & \vdots \\ \vdots & \vdots & \dots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{mn} \end{bmatrix}, \quad X = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix}, \quad B = \begin{bmatrix} b_1 \\ b_2 \\ \vdots \\ b_m \end{bmatrix}$$

The  $m \times (n+1)$  matrix, denoted  $[A|B]$  is called the augmented matrix of the system

$$[A|B] = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1n} & b_1 \\ a_{21} & a_{22} & \dots & a_{2n} & b_2 \\ \vdots & \vdots & \dots & \vdots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{mn} & b_m \end{bmatrix}$$

If the system has atleast one solution, then the system is called consistent, otherwise the system is said to be inconsistent.

A system  $AX=B$

- (i) is consistent iff  $r(A) = \text{rank}([A|B])$ .
- (ii) has a unique solution iff  $r(A) = r([A|B]) = n$ , the number of unknowns (In this case  $m \geq n$ ).
- (iii) has infinitely many solutions if and only if  $r(A) = r([A|B]) < \min\{m, n\}$ .

**Remark1:** If  $m = n$  and the  $r(A) = n$ , then the  $r(A) = r([A|B]) = n$  and hence the system  $AX = B$  has a unique solution and the solution is given by  $X = A^{-1}B$ .

**Remark 2:** To test whether the system  $AX = B$ , when  $m = n$ , is consistent or not, and if it is consistent, then to find the solutions of the system, we can use elementary row operation to the augmented matrix  $[A|B]$  and reduce  $A$  in  $[A|B]$  to a triangular matrix.

**Note:**

- i) If  $|A| \neq 0$ , then the system has a unique solution,  $\therefore$  It is consistent.
- ii) If  $|A| = 0$  and if  $r(A) = r([A|B])$ , then the system has infinitely many solutions and hence consistent.
- iii) If  $|A| = 0$  and if  $r(A) \neq r([A|B])$  then the system has no solution and hence the system is inconsistent

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**Assignment on Matrices and Determinants**

- 1) If  $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ , show that A satisfies  $A^2 - 5A + 7I = 0$ . Hence determine  $A^3$  and  $A^{-1}$ .
- 2) Find the inverse of  $\begin{bmatrix} 1 & 2 & -1 \\ 3 & 8 & 2 \\ 4 & 9 & -1 \end{bmatrix}$ , if it exists, using adjoint.
- 3) Find the rank of matrix using elementary row/column operation:  
 $\begin{bmatrix} 1 & 2 & -2 & 3 \\ 2 & 5 & -4 & 6 \\ -1 & -3 & 2 & -2 \\ 2 & 4 & -1 & 6 \end{bmatrix}$
- 4) Find rank of the matrix  $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 4 & 1 & 0 & 2 \\ 0 & 3 & 4 & 2 \end{bmatrix}$  by examining the determinant of minors.
- 5) For what value of  $\lambda$  and  $\mu$ , the system of equations:
- $$\begin{aligned} x + y + z &= 6 \\ x + 2y + 3z &= 10 \\ x + 2y + \lambda z &= \mu \end{aligned}$$
- (i) Consistent  
(ii) Consistent with unique solution  
(iii) Inconsistent
- 6) Apply the properties of determinants and calculate :
- i)  $A = \begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$ ,    ii)  $B = \begin{vmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$ ,    and iii)  $C = \begin{vmatrix} 2 & 3 & 4 \\ 2 & a+3 & b+4 \\ 2 & c+3 & d+4 \end{vmatrix}$ .



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## Module-9 Statistics

### Measures of Central Tendency

The primary purpose of statistical methods is to summarize the information contained in any set of collected data. The purpose is served by classifying the data in form of a frequency distribution and using various graphs, viz., line diagrams, bar diagrams, pictorial diagrams, representation of percentages, statistical maps. When the data related to a variable, the process of summarization can be taken a long step further by using certain descriptive measures. The aim is to focus on certain features of the data which will describe the general nature of the data. The two most important features are **Central tendency** and **Dispersion**.

#### Central Tendency:

Let us consider the following table.

**Table 1:** Yield per plant for 12 tomato plants of a particular varieties:

Plant No.	Yield (gm.)	Plant No.	Yield (gm.)
1.	1,216	7.	1,202
2.	1,374	8.	1,372
3.	1,167	9.	1,278
4.	1,232	10.	1,141
5.	1,407	11.	1,221
6.	1,453	12.	1,329

From Table 1, it is clearly evident that the figures seem to cluster around some point between 1,200 gm. and 1,300 gm. However, we need a single value, the central value, to represent the whole set of figures. Such a representative or typical value of a variable is called the measure of central tendency or an average.

Three commonly used measures of central tendency are

- I. Arithmetic mean
- II. Median
- III. Mode

#### Arithmetic Mean:

Let us denote the variable by  $x$ , and the corresponding values of the variable  $x$  by  $x_1, x_2, \dots, x_n$ .

For example, let  $x$  represents the height of  $n$  students and the corresponding heights are represented by  $x_1, x_2, \dots, x_n$ .

Then the arithmetic mean ( $A.M$ ) of  $x$  is given by,

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$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i \tag{1.1}$$

**Example 1.** For the data given in Table 1. *A.M* is .....

$$\begin{aligned} &= \frac{1,216 + 1,374 + \dots + 1,329}{12} \\ &= \frac{15,392}{12} \\ &= 1,282.67 \text{ gm.} \end{aligned}$$

**Example 2.**

Let us consider the following table

**Table 2.** Frequency distribution of number of peas per pod for 198 pods.

<u>No. of Peas</u>	<u>Frequency (<math>f_i</math>)</u>
1.	4
2.	33
3.	76
4.	50
5.	26
6.	8
7.	1
<b>Total</b>	<b>198 = <math>\sum_{i=1}^7 f_i</math></b>

In the above table, the value 1 occurs 4 times, value 2 occurs 33 times, and so on.

Therefore, if in the above example  $x$  represents the no. of peas per pod and the corresponding value of  $x$ , i.e.,  $x_i$  ( $i=1, 2, \dots, 198$ ) represents the no. of peas in it. Then...

$$\begin{aligned} \sum_{i=1}^{198} x_i &= 1 \times 4 + 2 \times 33 + 3 \times 76 + 4 \times 50 + 5 \times 26 + 6 \times 8 + 7 \times 1 \\ &= 683. \end{aligned}$$

Hence, *A.M* of  $x$  is given by....

$$\begin{aligned} \bar{x} &= \frac{1 \times 4 + 2 \times 33 + 3 \times 76 + 4 \times 50 + 5 \times 26 + 6 \times 8 + 7 \times 1}{198} \\ &= \frac{683}{198} = 20.697 \end{aligned}$$

Therefore, if the numbers occur  $f_1, f_2, \dots, \dots, \dots, f_n$  times, respectively (i.e., occur with frequencies  $f_1, f_2, \dots, \dots, \dots, f_n$  the arithmetic mean is given by

$$\bar{x} = \frac{\sum_{i=1}^n x_i f_i}{\sum_{i=1}^n f_i} = \frac{1}{N} \sum_{i=1}^n x_i f_i \tag{1.2}$$

Where  $N = \sum_{i=1}^n f_i$  is the total frequency.

When we have a frequency table which represents the frequencies in the different classes, then also we will use the formula (1.2) for calculating the arithmetic mean. However, in this case  $x_i$  will represent the mid value of width class interval. But in this case (1.2) will give only an approximate value of the mean. The error of approximation will be negligible provided the range of  $x$  is very large compared to the width of the class-intervals.

**Example 3.**

(a.) Find the arithmetic mean of the following frequency distribution

$x_i$ :	1	2	3	4	5	6	7
$f_i$ :	5	9	12	17	14	10	6

(b.) Calculate the arithmetic mean of the marks from the following table:

Marks:	0-10	10-20	20-30	30-40	40-50	50-60
No. of students.	12	18	27	20	17	6

**Solution:**

(A)	$x_i$	$f_i$	$x_i f_i$
	1	5	5
	2	9	18
	3	12	36
	4	17	68
	5	14	70
	6	10	60
	7	6	42
	<b>Total</b>	<b>73</b>	<b>299</b>

  
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$$\bar{x} = \frac{\sum x_i f_i}{\sum f_i} = \frac{299}{73} = 4.0959$$

(b) :

Marks	Mid Points $x_i$	No. of Students $f_i$	$x_i f_i$
0-10	5	12	60
10-20	15	18	270
20-30	25	27	675
30-40	35	20	700
40-50	45	17	765
50-60	55	6	330
		<b>100</b>	<b>2800</b>

$$\begin{aligned} \text{Arithmetic mean (A.M)} &= \frac{\sum x_i f_i}{\sum f_i} \\ &= \frac{2800}{100} = 28. \end{aligned}$$

Average marks of the students are 28.

It may be noted here that if the values of  $x_i$ 's (and) or  $f_i$ 's are large, the calculation of mean by formula (1.2) is quite time-consuming and tedious.

Let  $d_i = x_i - A, i = 1, 2, \dots, n$

$$f_i d_i = \sum f_i (x_i - A) = f_i x_i - A f_i, \quad i = 1, 2, \dots, n$$

$$\frac{1}{N} \sum f_i d_i = \frac{1}{N} \sum_{i=1}^n x_i f_i - A$$

$$\dots N = \sum_{i=1}^n f_i$$

$$= \bar{x} - A.$$

$$\bar{x} = A + \frac{1}{N} \sum_{i=1}^n f_i d_i \quad (1.3)$$

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where A is any arbitrary point.

Let us verify frequency distribution.

$$\text{Let } d_i = \frac{x_i - A}{h}, \quad i = 1, 2, \dots, n$$

A is an arbitrary point

h is the common magnitude of class interval

$$\text{Now } h d_i = x_i - A$$

$$\triangleright \sum_{i=1}^n h d_i f_i = \sum_{i=1}^n x_i f_i - A \sum_{i=1}^n f_i$$

$$\triangleright \frac{h}{N} \sum_{i=1}^n d_i f_i = \bar{x} - A$$

$$\bar{x} = A + \frac{h}{N} \sum_{i=1}^n d_i f_i$$

(1.4)

**Example 4.**

Calculate the simple mean/arithmetical mean/ mean for the following frequency distribution.

Class interval: 0-8	8-16	16-24	24-32	32-40	40-48
Frequency: 8	7	16	24	15	7

**Solution:**

<u>Class interval</u>	<u>Mid Value(x<sub>i</sub>)</u>	<u>Frequency (f<sub>i</sub>)</u>	<u>(d<sub>i</sub>) = <math>\frac{x_i - A}{h}</math></u>	<u>f<sub>i</sub>d<sub>i</sub></u>
0-8	4	8	-3	-24
8-16	12	7	-2	-14
16-24	20	16	-1	-16
24-32	28(=A)	24	0	0
32-40	36	15	1	15
40-48	44	7	2	14
<b>Total</b>		<b>77(=N)</b>		<b>-25</b>

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Let us consider  $A=28$  &  $h=8$

$$\bar{x} = A + \frac{h}{N} \sum f_i d_i = 28 + \frac{8}{77} (-25) = 25.404$$

**The Weighted Arithmetic Mean:**

In calculating arithmetic mean we assume that all the items in the distribution have equal importance. But in practice this may not be so. If some items in a distribution are more important than others, then this point must be considered in calculating the average. In such cases, proper weights must be given to various items. The weights attached to each item being proportional to the importance of the item in the distribution.

For example, let  $w_i$  be the weight attached to the item

$x_i, i = 1, 2, \dots, n$  then we define:

Weighted arithmetic mean (or weighted mean)

$$= \frac{\sum_{i=1}^n w_i x_i}{\sum_{i=1}^n w_i} \tag{1.5}$$

**Example 5:**

If a final examination in a course is weighted 3 times as much as a quiz and a student has a final examination grade of 85 and quiz grades of 70 and 90, then the mean grade is.

$$\bar{x} = \frac{1 \times 70 + 1 \times 90 + 3 \times 85}{1 + 1 + 3} = 415/5 = 83.$$

**Median:**

Median of a distribution is the value of the variable which divides the entire set of values into two equal parts. The median is thus a positional average.

In case of ungrouped data, if the number of observations is odd then median is the middle value after the values have been arranged in ascending or descending order of magnitude. In case of even number of observations, there are two middle terms and median is obtained by taking the arithmetic mean of the middle terms.

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For example, the median of the values 25, 20, 15, 10, 5, 21, 7, i.e. 5, 7, 10, 15, 20, 21, 25 is 15. And the median of 8, 16, 12, 1, 2, 9, 15, 30, 25, 4 i.e. 1, 2, 4, 8, 9, 12, 15, 16, 25, 30 is

$$= \frac{1}{2}(9 + 12) = 10.5$$

**Remark:** In case of even number of observation, in fact any value lying between the two middle values can be taken as median but conventionally we take it to be the mean of the middle term.

In case of discrete frequency distribution median is obtained by considering the cumulative frequencies.

The steps for calculating median are given below:

- I. Find  $\frac{1}{2}N$ , where  $N = \sum_{i=1}^n f_i$
- II. see the (less than) cumulative frequency(c.f.) just greater than  $\frac{1}{2}N$ .
- III. The corresponding value of  $x$  is median.

**Example 6.**

Obtain the median for the following frequency distribution:

$x_i$ :	1	2	3	4	5	6	7	8	9
$f_i$ :	8	10	11	16	20	25	15	9	6

<b>Solution:</b>	$x_i$	$f_i$	$c.f.$
	1	8	8
	2	10	18
	3	11	29
	4	16	45
	5	20	65
	6	25	90
	7	15	105
	8	9	
	9	6	120 (=N)

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$$\therefore \frac{1}{2}N = \frac{120}{2} = 60$$

$\therefore$  The cumulative frequency just greater than  $N/2$  is 65 and the corresponding value of  $x_i$  is 5.

∴ Median is 5.

**Median for continuous frequency distribution:**

In case of continuous frequency distribution, the class corresponding to the (less than) cumulative frequency just greater than  $\frac{1}{2}N$  is called the median class and the value of median is obtained by the following formula.

$$\text{Median} = l + \frac{h}{f} \left( \frac{N}{2} - c \right) \tag{1.6}$$

Where,

$l$  is the lower limit of the median class.

$f$  is the frequency of the median class.

$h$  is the length of the median class.

$c$  is the c. f. of the class preceding the median class.

**Example. 7**

Find the median wage of the following distribution

Wages (in Rs.):	2000-3000	3000-4000	4000-5000	5000-6000	6000-7000
No. of workers:	3	5	20	10	5

**Solution:**

<u>Wages(in Rs.)</u>	<u>No. of workers</u>	<u>c. f</u>
2000-3000	3	3
3000-4000	5	8
4000-5000	20	28
5000-6000	10	38
6000-7000	5	43

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$N=43, \Rightarrow \frac{N}{2} = 21.5$

Cumulative frequency just greater than 21.5 is 28 and the corresponding class is 4000-5000.

Thus the median class is 4000-5000.

These median wages is Rs 4,675

**Mode:**

Mode is the value which occurs most frequently in a set of observations. In other words, mode is the value of the variable which is predominant in the series. For example, in the following frequency distribution

$x$ :	1	2	3	4	5	6	7	8
$f$ :	4	9	16	25	22	15	7	3

Value of  $x$  corresponding to the maximum frequency, viz, 25 are 4. Hence, mode is 4.



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**Mode for continuous frequency distribution:**

In case of continuous frequency distribution, mode is given by the formula:

$$\begin{aligned} \text{Mode} &= l + \frac{h(f_1 - f_0)}{(f_1 - f_0) - (f_2 - f_1)} \\ &= l + \frac{h(f_1 - f_0)}{2f_1 - f_0 - f_2} \end{aligned} \quad (1.7)$$

Where,  $l$  is lower limit of the modal class.

$h$  is length/magnitude of the modal class.

$f_1$  is frequency of the class preceding the modal class.

$f_2$  is Frequency of the class succeeding the modal class.

In modal class is the class with maximum frequency.

**Example 8.**

Find the mode for the following distribution

Class-interval:	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency:	5	8	7	12	28	20	10	10

**Solution:** Maximum frequency is 28

∴ The modal class is 40-50

$$\therefore \text{Mode} = 10 + \frac{10(28-12)}{2 \times 28 - 12 - 20} = 40 + 6.666 = 46.67$$

**DISPERSION**

Average or measures of central tendency give us an idea of the concentration of the observations about the central part of the distribution.

Let us consider the following three set of data

I.	$x :$	7,	8,	9,	10,	11	$\Rightarrow \sum x_i = 45$ & $\bar{x} = 9$
II.	$x :$	3,	6,	9,	12,	15	$\Rightarrow \sum x_i = 45$ & $\bar{x} = 9$
III.	$x :$	1,	5,	9,	13,	17	$\Rightarrow \sum x_i = 45$ & $\bar{x} = 9$

  
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In all the above cases we have 5 observations with mean 9. If we have given that the mean of 5 observations is 9 we cannot form an idea as to whether it is the average of 1<sup>st</sup> set of data or 3<sup>rd</sup> set of data or some other set of data. Whose sum is 45.

Thus we see that the measures of central tendency are inadequate to give us a complete idea of the distribution. They must be supported and supplemented by some other measures. One such measure is dispersion.

Literal meaning of dispersion is “scatteredness” Dispersion gives us an idea about the homogeneity or heterogeneity of the distribution.

### Measures of Dispersion:

Various measures of dispersion are as follows:

- I. Range.
- II. Mean deviation.
- III. Standard deviation.

### Range:

The simplest measure of the dispersion of a variable is its range, which is defined as the difference between the highest (maximum) and the lowest (minimum) Values of the observation/variable.

Let us consider an example here. Suppose two students, A and B of a college received the following marks in eight monthly examinations in a particular subject:

Marks obtained by A	Marks obtained by B
63	61
47	54
56	56
44	57
66	60
65	59
80	55
43	62

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In this example, average score of both the student A & B is same, i. e., 58. In this example, the range of the marks obtained by A is  $80-43=37$  and that of B is  $62-54=8$ .

**Mean deviation:**

Let  $x_A$  be the chosen average value of the variable  $x$ , then  $x_i - x_A$  is the deviation of the  $i^{th}$  given value of  $x$  from the average. Clearly the higher the deviations

$$x_1 - x_A, x_2 - x_A, \dots, x_n - x_A$$

In magnitude, the higher is the dispersion of  $x$ . One may therefore, consider some way of combining the deviations to get a measure of dispersion. It is readily seen that the simple arithmetic mean of the deviations, viz.  $\frac{1}{n} \sum_i (x_i - x_A)$ , cannot serve this purpose, as the sum of the deviation and proportionally the arithmetic mean may be quite small even when the individual deviations are large, positive and negative deviations almost cancelling each other. In fact, if  $x_A$  is considered to be the arithmetic mean of  $x$ , then the sum of the deviation vanishes, whatever the deviations are individually. This difficulty may be overcome by considering, their absolute values instead of the deviations in which the magnitude of the deviations (and not their sign) will be considered. The arithmetic mean of the absolute deviations of  $x_i$  from  $x_A$  is the required measure of dispersion and is referred to as the mean deviation of  $x$  about  $x_A$ , denoted by  $MD_A$  and given by-

$$MD_A = \frac{1}{n} \sum_{i=1}^n f_i |x_i - x_A| \tag{2.1}$$

It can be shown that  $MD_A$  is least when measure about median. Let us consider the same example as discussed above.

Marks obtained By $A(x^{(1)})$	$x_i^{(1)} - x^{-{(1)}}$	Marks obtained by $A(x^{(2)})$	$x_i^{(2)} - x^{-{(2)}}$
63	5	61	3
47	-11	54	-4
56	-2	56	-2
44	-14	57	-1
66	8	60	2
65	7		
80	22		
43	-15		

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Let

$$x^{-{(1)}} = x^{-{(2)}} = \bar{x} = 58 = x_A \text{ (Arithmetic Mean)}$$

$$\therefore \sum_{i=1}^8 |x_i^{(1)} - x_A| = 5+11+2+14+8+7+22+15=84$$

$$\therefore \frac{1}{8} \sum_{i=1}^8 |x_i - x_A| = \frac{84}{8} = 10.5$$

$$\sum_{i=1}^8 |x_i^{(2)} - x_A| = 3+4+2+1+2+1+3+4=20$$

$$\therefore \frac{1}{8} \sum_{i=1}^8 |x_i^{(2)} - x_A| = \frac{20}{8} = 2.5$$

∴ Mean deviation of the marks obtained by the students A and B about the arithmetic mean 58 are 10.5 and 2.5, respectively.

If  $(x_i, f_i), i=1, 2, \dots, n$  be the frequency distribution of a variable  $x$ , the mean deviation of  $x$  about the average  $x_A$  (may be mean, median or mode) is given by...

$$MD_A = \frac{1}{N} \sum_{i=1}^n f_i |x_i - x_A| \quad ; \sum_{i=1}^n f_i = N \tag{2.2}$$

**Example 9.**

Calculate the mean deviation from mean (A.M) for the following data:

<b>Marks:</b>	0-10	10-20	20-30	30-40	40-50	50-60	60-70
<b>No. of Students:</b>	6	5	8	15	7	6	3

Marks	Mid Points ( $x_i$ )	No. of students ( $f_i$ )	$d_i = \frac{x_i - A}{h}$	$d_i f_i$	$ x_i - \bar{x} $ $ x_i - 33.4 $
0-10	5	6	-3	-18	28.4
10-20	15	5	-2	-10	18.4
20-30	25	8	-1	-8	8.4
30-40	35(=A)	15	0	0	1.6
40-50	45	7	1	7	11.6
50-60	55	6	2	12	21.6
60-70	65	3	3	9	31.6
		<b>50 (=N)</b>			

$$N = \sum_{i=1}^n f_i = 50$$

Let  $A = 35$  &  $h = 10$

  
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$$A. m. = \bar{x} = A + \frac{h}{n} \sum_{i=1}^7 f_i d_i = 35 + \frac{10}{50} (-8)$$

$$= 35 - 1.6 = 33.4 = \bar{x}$$

$$MD_{\bar{x}} = \frac{1}{N} \sum_{i=1}^7 f_i |x_i - \bar{x}|$$

$$= \frac{1}{50} [6 \times 28.4 + 5 \times 18.4 + 8 \times 8.4 + 15 \times 1.6 + 7 \times 11.6 + 6 \times 21.6 + 3 \times 31.6]$$

$$= \frac{659.2}{50}$$

$$= 13.184$$



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# SYLLABUS FOR BRIDGE COURSE IN PYTHON

Aim of the Bridge course in Engineering Mathematics is

1. To understand "PYTHON as a discipline and not as a subject".
2. To Bridge "the School education and Engineering education".
3. To make "learning of PYTHON PROGRAMMING as a pleasant experience".

## Introduction

1 What is Python? Python is a high-level scripting language which can be used for a wide variety of text processing, system administration and internet-related tasks. Unlike many similar languages, its core language is very small and easy to master, while allowing the addition of modules to perform a virtually limitless variety of tasks. Python is a true object-oriented language, and is available on a wide variety of platforms. There's even a python interpreter written entirely in Java, further enhancing python's position as an excellent solution for internet-based problems. Python was developed in the early 1990's by Guido van Rossum, then at CWI in Amsterdam, and currently at CNRI in Virginia. In some ways, python grew out of a project to design a computer language which would be easy for beginners to learn, yet would be powerful enough for even advanced users. This heritage is reflected in python's small, clean syntax and the thoroughness of the implementation of ideas like object-oriented programming, without eliminating the ability to program in a more traditional style. So python is an excellent choice as a first programming language without sacrificing the power and advanced capabilities that users will eventually need.

## The very Basics of Python

There are a few features of python which are different than other programming languages, and which should be mentioned early on so that subsequent examples don't seem confusing. Further information on all of these features will be provided later, when the topics are covered in depth. Python statements do not need to end with a special character – the python interpreter knows that you are done with an individual statement by the presence of a newline, which will be generated when you press the "Return" key of your keyboard. If a statement spans more than one line, the safest course of action is to use a backslash (\) at the end of the line to let python know that you are going to continue the statement on the next line; you can continue using backslashes on additional continuation lines. (There are situations where the backslashes are not needed which will be discussed later.) Python provides you with a certain level of freedom when composing a program, but there are some rules which must always be obeyed. One of these rules, which some people find very surprising, is that python uses indentation (that is, the amount of white space before the statement itself) to indicate the presence of loops, instead of using delimiters like curly braces ({} ) or keywords (like "begin" and "end") as in many other languages. The amount of indentation you use is not important, but it must be consistent within a given depth of a loop, and statements which are not indented must begin in the first column. Most python programmers prefer to use an editor like emacs, which automatically provides consistent indentation; you will probably find it easier to maintain your programs if

you use consistent indentation in every loop, at all depths, and an intelligent editor is very useful in achieving this.

### Indentation

Unlike most programming languages, where indentation is used simply to improve readability of programs, python uses indentation to signal the beginning and end of blocks of statements, that is, groups of statements which will be executed together based on the value of some condition, or the occurrence of an exception. The first statement of your programs must start in the very first column, and within each indented block, you must be consistent in the amount of indentation you use. Although not strictly required, most python programmers try to be consistent in their indentation from block to block as well. The task of writing properly indented programs is made much easier if you use an editor which is python-aware; emacs and vim are examples of such editors, as well as the IDLE or pythonwin programming environments supplied as part of python distributions.

Although it takes some getting used to, using indentation to group statements together has some definite benefits. Since there are no brackets or keywords involved in delineating blocks of statements, no decisions need to be made as to whether the delimiters should appear on the same line as program statements, or if they should line up with the beginnings or ends of blocks. The result of this is that most python programs look very similar, even if they were written by different people, making "foreign" python programs much easier to read and understand. In addition, since the indentation of a program actually determines its structure, python programs provide easy-to-see visual clues to help you understand what a program is doing.

### Invoking Python

There are three ways to invoke python, each with its own uses. The first way is to type "python" at the shell command prompt. This brings up the python interpreter with a message similar to this one: Python 2.1 (#2) Aug 27 2002, 09:01:47 [GCC 2.95.4 20011002 (Debian prerelease)] on linux2 (Type "help", "copyright", "credits" or "license" for more information). The three greater-than signs (>>>) represent python's prompt; you type your commands after the prompt, and hit return for python to execute them. If you've typed an executable statement, python will execute it immediately and display the results of the statement on the screen.

For example, if I use python's print statement to print the famous "Hello, world" greeting, I'll immediately see a response:

```
>>> print 'hello,world' hello,world
```

When using the python interpreter this way, it executes statements immediately, and, unless the value of an expression is assigned to a variable (See Section 6.1), python will display the value of that expression as soon as it's typed. This makes python a very handy calculator:

```
>>> cost = 27.00
>>> taxrate = .075
>>> cost * taxrate 2.025
>>> 16 + 25 + 92 * 3 317
```

### String Constants

Strings are a collection of characters which are stored together to represent arbitrary text inside a python program. You can create a string constant inside a python program by surrounding text with either single quotes ('), double quotes ("), or a

collection of three of either types of quotes (''' or """). In the first two cases, the opening and closing quotes must appear on the same line in your program; when you use triple quotes, your text can span as many lines as you like. The choice of which quote symbol to use is up to you – both single and double quotes have the same meaning in python.

Here are a few examples of how to create a string constant and assign its value to a variable:

```
name = 'Phil' value = "$7.00"
```

```
helptext = """You can create long strings of text spanning several lines by using triple quotes at the beginning and end of the text"""
```

### **Numeric Data**

Python supports four types of numeric objects: integers, long integers, floating point numbers, and complex numbers.

Lists, Tuples and Dictionaries

Lists provide a general mechanism for storing a collection of objects indexed by a number in python. The elements of the list are arbitrary — they can be numbers, strings, functions, user-defined objects or even other lists, making complex data structures very simple to express in python. You can input a list to the python interpreter by surrounding a comma separated list of the objects you want in the list with square brackets ([ ]) Thus, a simple list of numbers can be created as follows:

```
>>> mylist = [1,7,9, 13, 22, 31]
```

Python ignores spaces between the entries of a list. If you need to span multiple lines with a list entry, you can simply hit the return key after any comma in the list:

```
>>> newlist = [7, 9, 12, 15, ... 17,19,103]
```

Note that the python interpreter changes its prompt when it recognizes a continuation line, and that no indentation is necessary to continue a line like this. Inside a script, your input can also be broken up after commas in a similar fashion. To create an empty list, use square brackets with no elements in between them ([ ]).

### **Tuple Objects**

Tuples are very much like lists, except for one important difference. While lists are mutable, tuples, like strings, are not. This means that once a tuple is created, its elements can't be modified in place. Knowing that a tuple is immutable, python can be more efficient in manipulating tuples than lists whose contents can change at any time, so when you know you won't need to change the elements within a sequence, it may be more efficient to use a tuple instead of a list. In addition, there are a number of situations (argument passing and string formatting for example) where tuples are required. Tuples are created in a similar fashion to lists, except that there is no need for square brackets surrounding the value. When the python interpreter displays a tuple, it always surrounds it with parentheses; you can use parentheses when inputting a tuple, but it's not necessary unless the tuple is part of an expression. This creates a slight syntactic problem when creating a tuple with either zero or one element; python will not know you're creating a tuple. For an empty (zero-element) tuple, a pair of empty parentheses (()) can be used. But surrounding the value with parentheses is not enough in the case of a tuple with exactly one element, since parentheses are used for grouping in arithmetic expression. To specify a tuple with only one element in an assignment statement, simply follow the element with a comma. In arithmetic

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expressions, you need to surround it with parentheses, and follow the element with a comma before the closing parenthesis.

```
>>> values = (3,4,5 )
```

### Dictionaries

Dictionaries (sometimes referred to as associative arrays or hashes) are very similar to lists in that they can contain arbitrary objects and can be nested to any desired depth, but, instead of being indexed by integers, they can be indexed by any immutable object, such as strings or tuples. Since humans can more easily associate information with strings than with arbitrary numbers, dictionaries are an especially convenient way to keep track of information within a program. As a simple example of a dictionary, consider a phonebook. We could store phone numbers as tuples inside a list, with the first tuple element being the name of the person and the second tuple element being the phone number:

```
>>> phonedict = {'Fred':555-1231,'Andy':555-1195,'Sue':555-2193}
```

### Basic Principles of Python

Python has many features that usually are found only in languages which are much more complex to learn and use. These features were designed into python from its very first beginnings, rather than being accumulated into an end result, as is the case with many other scripting languages. If you're new to programming, even the basic descriptions which follow may seem intimidating. But don't worry – all of these ideas will be made clearer in the chapters which follow. The idea of presenting these concepts now is to make you aware of how python works, and the general philosophy behind python programming. If some of the concepts that are introduced here seem abstract or overly complex, just try to get a general feel for the idea, and the details will be fleshed out later

#### 1. Basic Core Language

Python is designed so that there really isn't that much to learn in the basic language. For example, there is only one basic structure for conditional programming (if/else/elif), two looping commands (while and for), and a consistent method of handling errors (try/except) which apply to all python programs. This doesn't mean that the language is not flexible and powerful, however. It simply means that you're not confronted with an overwhelming choice of options at every turn, which can make programming a much simpler task.

#### 2. Modules

Python relies on modules, that is, self-contained programs which define a variety of functions and data types, that you can call in order to do tasks beyond the scope of the basic core language by using the import command. For example, the core distribution of python contains modules for processing files, accessing your computer's operating system and the internet, writing CGI scripts (which handle communicating with pages displayed in web browsers), string handling and many other tasks. Optional modules, available on the Python web site (<http://www.python.org>), can be used to create graphical user interfaces, communicate with data bases, process image files, and so on. This structure makes it easy to get started with python, learning specific skills only as

you need them, as well as making python run more efficiently by not always including every capability in every program.

### 3. Object Oriented Programming

Python is a true object-oriented language. The term “object oriented” has become quite a popular buzzword; such high profile languages as C++ and Java are both object oriented by design. Many other languages add some object-oriented capabilities, but were not designed to be object oriented from the ground up as python was. Why is this feature important? Object oriented program allows you to focus on the data you’re interested in, whether it’s employee information, the results of a scientific experiment or survey, setlists for your favorite band, the contents of your CD collection, information entered by an internet user into a search form or shopping cart, and to develop methods to deal efficiently with your data. A basic concept of object oriented programming is encapsulation, the ability to define an object that contains your data and all the information a program needs to operate on that data. In this way, when you call a function (known as a method in object-oriented lingo), you don’t need to specify a lot of details about your data, because your data object “knows” all about itself. In addition, objects can inherit from other objects, so if you or someone else has designed an object that’s very close to one you’re interested in, you only have to construct those methods which differ from the existing object, allowing you to save a lot of work.

### 4. Namespaces and Variable Scoping

When you type the name of a variable inside a script or interactive python session, python needs to figure out exactly what variable you’re using. To prevent variables you create from overwriting or interfering with variables in python itself or in the modules you use, python uses the concept of multiple namespaces. Basically, this means that the same variable name can be used in different parts of a program without fear of destroying the value of a variable you’re not concerned with. To keep its bookkeeping in order, python enforces what is known as the LGB rule. First, the local namespace is searched, then the global namespace, then the namespace of python built-in functions and variables. A local namespace is automatically created whenever you write a function, or a module containing any of functions, class definitions, or methods. The global namespace consists primarily of the variables you create as part of the “toplevel” program, like a script or an interactive session. Finally, the built-in namespace consists of the objects which are part of python’s core

### 5. Exception Handling

Regardless how carefully you write your programs, when you start using them in a variety of situations, errors are bound to occur. Python provides a consistent method of handling errors, a topic often referred to as exception handling. When you’re performing an operation that might result in an error, you can surround it with a try loop, and provide an except clause to tell python what to do when a particular error arises. While this is a fairly advanced concept, usually found in more complex languages, you can start using it in even your earliest python programs. As a simple example, consider dividing two numbers. If the divisor is zero, most programs (python included) will stop running, leaving the user back at a system shell prompt, or

with nothing at all. Here's a little python program that illustrates this concept; assume we've saved it to a file called div.py:

```
#!/usr/local/bin/python
x = 7
y = 0
print x/y
print "Now we're done!"
```

When we run this program, we don't get to the line which prints the message, because the division by zero is a "fatal" error: % div.py Traceback (innermost last):File "div.py", line 5, in ? print x/y ZeroDivisionError: integer division or modulo

While the message may look a little complicated, the main point to notice is that the last line of the message tells us the name of the exception that occurred. This allows us to construct an except clause to handle the problem:

```
x = 7
y = 0
try:
    print x/y
except ZeroDivisionError:
    print "Oops - I can't divide by zero, sorry!"
print "Now we're done!"
```

Now when we run the program, it behaves a little more nicely: % div.py Oops - I can't divide by zero, sorry! Now we're done!

## File Objects

In python, access to files is provided through a file object, which is created by calling the builtin open function. Once such an object is created, a large number of methods are available for accessing the file, both for reading and writing. The open function takes between one and three arguments. The first, which is the only required argument, is the name of the file to open.

String Meaning

r Open file for reading; file must exist.

w Open file for writing; will be created if it doesn't exist

a Open file for appending; will be created if it doesn't exist

r+ Open file for reading and writing; contents are not destroyed

w+ Open file for reading and writing; contents are destroyed

a+ Open file for reading and writing; contents are not destroyed

Methods for Reading

The readline method reads a single line from a file, including its terminating newline. (Under Windows, when Python reads text from a file, it discards the line feed which is on each line, leaving just a newline character.) To eliminate this newline, a common practice is to replace the read line with a string slice which eliminates the last character of the line:

```
>>> f = open('inputfile', 'r')
>>> line = f.readline()
>>> line 'Line one\n'
>>> line = line[:-1]
>>> line 'Line one'
```

The readlines method reads an entire file in a single call and returns a list consisting of all of the lines in the file; each element of the list returned by readlines contains

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one line (including the terminating newline) from the file. Once the readlines method is invoked once, subsequent calls on the same file object will return an empty list, unless the file is rewound (Section 5.4.4) or closed and reopened. The read method reads an entire file in a single call and returns the contents of the file in a scalar string variable, with newlines embedded within the string. An optional integer argument n limits the amount of data read to n bytes.

#### Methods for Writing

Before discussing the available methods for writing to a file, remember that, in order to write to a file, the file must be opened with either the 'w' (write) or 'a' (append) modes. Furthermore, the objects to be written must be strings - no automatic conversion of numbers to strings is carried out. The write method takes a single scalar argument and writes it to the file represented by the file object on which it operates. Note that, unlike the print command, the write method does not automatically append a newline character to its argument. One consequence of this is that you can safely write binary files, or files with embedded null characters, using the write method. The writelines method accepts a list argument, and writes each element of the list to the specified file as if a call to the write method had been made; no newlines are added to the output.



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(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)



## DEPARTMENT OF SCIENCE AND HUMANITIES

### SECTION A- CSE

S.NO	NAME	DEPT	07.11.2022		08.11.2022		09.11.2022	
			1	2	1	2	1	2
1	Aakhil Mohamed	CSE	/	/	/	/	/	/
2	Abdalah	CSE	/	/	/	/	/	/
3	Afroze Rowshan.A	CSE	/	/	/	/	/	/
4	Akash	CSE	/	/	/	/	/	/
5	Anas Rahman	CSE	/	/	/	/	/	/
6	Ashwath.K	CSE	/	/	/	/	/	/
7	Bhuvaneswari	CSE	/	/	/	/	/	/
8	Brajin Sanu	CSE	/	/	/	/	/	/
9	Charumathi	CSE	/	/	/	/	/	/
10	Chitharth	CSE	a	a	/	/	/	/
11	Dharnish Babu	CSE	/	/	/	/	/	/
12	Gomathi	CSE	/	/	/	/	/	/
13	Hamdan Ashraf	CSE	/	/	/	/	/	/
14	Hanish	CSE	/	/	/	/	/	/
15	Hanzul Mahrifa	CSE	/	/	/	/	/	/
16	Hariharan .G	CSE	/	/	/	/	/	/
17	Harinisri	CSE	/	/	/	/	/	/
18	Ibrahim Shafeeq	CSE	/	/	/	/	/	/
19	Irfan Ahamed	CSE	/	/	/	/	/	/
20	Jazeer Ahamed.J	CSE	/	/	/	/	/	/
21	Jeevesh . R	CSE	/	/	/	/	/	/
22	Joshwa	CSE	/	/	/	/	/	/
23	Kathija Shameema	CSE	/	/	/	/	/	/
24	Manigandan	CSE	/	/	/	/	/	/
25	Marwan Ali	CSE	/	/	/	/	/	/
26	karthikeyan M	CSE	/	/	/	/	/	/
27	Mohamed Ashraf	CSE	/	/	/	/	/	/
28	Mohamed Idrees	CSE	/	/	/	/	/	/
29	Mohamed Jamees	CSE	/	/	/	/	/	/
30	Mohamed Kamil Ameen	CSE	/	/	/	/	/	/
31	Mohamed MufEEK	CSE	/	/	/	/	/	/
32	Mohamed Tharik M.M	CSE	/	/	/	/	/	/
33	Mohamed Buhari	CSE	/	/	/	/	/	/
34	Mohamed Nazmi.A	CSE	/	/	/	/	/	/
35	Mugesh	CSE	/	/	/	/	/	/

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			1	2	1	2	1	2
36	Muthuraman	CSE	/	/	/	/	/	/
37	Nivethitha	CSE	/	/	/	/	/	/
38	Pradeep	CSE	a	a	/	/	/	/
39	Rajebul Ali	CSE	/	/	/	/	/	/
40	Sakthivel . V	CSE	/	/	/	/	/	/
41	Sankara Narayanan.S	CSE	/	/	/	/	/	/
42	Santhosh Mahara	CSE	/	/	/	/	/	/
43	Sathis Kumar .V	CSE	/	/	/	/	/	/
44	Shahid Sharif	CSE	/	/	/	/	/	/
45	Shajaneshwar.M.S	CSE	/	/	/	/	/	/
46	Suhaib.I	CSE	/	/	/	/	/	/
47	Suhail Ahamed	CSE	/	/	/	/	/	/
48	Surya s	CSE	/	/	/	/	/	/
49	Syed Aahil R	CSE	/	/	/	/	/	/
50	Syed Aahkil R	CSE	/	/	/	/	/	/
51	Vignesh.V	CSE	/	/	/	/	/	/
52	Vinoth.P	CSE	/	/	/	/	/	/
53	Yogeshwari A	CSE	/	/	/	/	/	/
54	Zakir Hussain.A	CSE	/	/	/	/	/	/

*Ms Pa Pa Ms Pa Ms*

Signature of the HOD (S & H)

*MSH*

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**DEPARTMENT OF SCIENCE AND HUMANITIES**

**Academic Year 2022-2023**

**SECTION B -IT**

S.NO	NAME	DEPT	07.11.2022		08.11.2022		09.11.2022	
			1	2	1	2	1	2
1	Aathif Hamdaan.M	IT	1	2	1	2	1	2
2	Abdul Basith.M	IT	/	/	/	/	/	/
3	Abdul Majeed.H	IT	/	/	/	/	/	/
4	Abdul Saboor.S	IT	/	/	/	/	/	/
5	Abdur Rahman.R	IT	/	/	/	/	/	/
6	Abimanyu	IT	/	/	/	/	/	/
7	Amirudeen.F	IT	/	/	/	/	/	/
8	Arshad Hameed.I	IT	/	/	/	/	/	/
9	Askarali.A	IT	/	/	/	/	/	/
10	Asma.A	IT	a	/	/	/	/	/
11	Dhanalakshmi.B	IT	/	/	/	/	/	/
12	Furkhan Nathar.M	IT	/	/	/	/	/	/
13	Ganesh.J	IT	/	/	/	/	/	/
14	Hafeezuul Naveed.H	IT	/	/	/	/	/	/
15	Hema.S	IT	/	/	/	/	/	/
16	Imtiyaz Ahamed.R	IT	/	/	/	/	/	/
17	Karan.E	IT	/	/	/	/	/	/
18	Karthikeyan	IT	/	/	/	/	/	/
19	Kavisree	IT	/	/	/	/	/	/
20	Kaviya.K	IT	/	/	/	/	/	/
21	Leelambikai.P	IT	/	/	/	/	/	/
22	Lokesh.K	IT	/	/	/	/	/	/
23	Manoj Kumar J.C	IT	/	/	/	/	/	/
24	Mesham Melton	IT	/	/	a	a	/	/
25	Mohamed Waseem.M	IT	/	/	/	/	/	/
26	Mohamed Adel.S	IT	/	/	/	/	/	/
27	Mohamed Afsal.M	IT	/	/	/	/	/	/
28	Mohamed Ashif .S	IT	/	/	/	/	/	/
29	Mohamed Asik.K	IT	/	/	/	/	/	/
30	Mohamed Aslam.S	IT	/	/	/	/	/	/
31	Mohamed Azaruedn.A	IT	/	/	/	/	/	/
32	Mohamed Ethisis.S	IT	/	/	/	/	/	/
33	Mohamed Hafeed	IT	/	/	/	/	/	/
34	Mohamed Hissam.M	IT	/	/	/	/	/	/
35	Mohamed Mujammil .L	IT	/	/	/	/	/	/

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
SIPCOT IT Highway Egattur,  
Chennai - 603103.



**DEPARTMENT OF SCIENCE AND HUMANITIES**  
**SECTION C AIDS/CSBS**

S.NO	NAME	DEPT	07.11.2022		08.11.2022		09.11.2022	
			1	2	1	2	1	2
1	Abu jabbar Mubarak.H	CSBS	/	/	/	/	/	/
2	Akeef Hussain.A	CSBS	/	/	/	/	/	/
3	Bhuvaneshwari.K	CSBS	/	/	/	/	/	/
4	Idrees.M	CSBS	/	/	/	/	/	/
5	Madhava Ram . A	CSBS	a	a	/	/	/	/
6	Mohamed Abdul Kalam.H	CSBS	/	/	/	/	/	/
7	Mohamed Aslam .A	CSBS	/	/	/	/	/	/
8	Mohamed Fazil.M.H	CSBS	/	/	/	/	/	/
9	Mohamed Ibrahim.S	CSBS	/	/	/	/	/	/
10	Mohamed Imthiyas.H	CSBS	/	/	/	/	/	/
11	Mohamed Irfak.J	CSBS	/	/	/	/	/	/
12	Prasanna.G	CSBS	/	/	/	/	/	/
13	Praveen.J	CSBS	/	/	/	/	/	/
14	Raseen.M	CSBS	/	/	/	/	/	/
15	Sanjay.M	CSBS	/	/	/	/	/	/
16	Surya Balaji .S	CSBS	/	/	/	/	/	/
17	Syed Inamul Hussain.S	CSBS	/	/	/	/	/	/
18	Vishwajith.G	CSBS	/	/	/	/	/	/
19	Viswanathan.B	CSBS	/	/	/	/	/	/
20	Sharon Gifty	CSBS	/	/	/	/	/	/
21	Karpoor Mohammed Hammad	CSBS	/	/	/	/	/	/
22	Abul Faize	AIDS	/	/	/	/	/	/
23	Abdul Hameed	AIDS	/	/	/	/	/	/
24	Aadhil Mohamed	AIDS	/	/	/	/	/	/
25	Ahamed Raasim	AIDS	/	/	/	/	/	/
26	Akram Bilal	AIDS	/	/	/	/	/	/
27	Ayesha	AIDS	/	/	/	/	/	/
28	Balaji	AIDS	/	/	/	/	/	/
29	Dhivya	AIDS	/	/	/	/	/	/
30	Hari Ragavendra	AIDS	/	/	/	/	/	/
31	Jessica Charlet	AIDS	/	/	/	/	/	/
32	Kaviyzhaghan	AIDS	/	/	/	/	/	/
33	Kevin Fannex	AIDS	/	/	/	/	/	/
34	Mithran	AIDS	/	/	/	/	/	/
35	Mohamed Asif	AIDS	/	/	/	/	/	/
36	Mohamed Hamza	AIDS	/	/	/	/	/	/
37	Mohamed Ibrahim	AIDS	/	/	/	/	/	/



**DEPARTMENT OF SCIENCE AND HUMANITIES**  
**SECTION-D**

S.NO	NAME	DEPT	07.11.2022		08.11.2022		09.11.2022	
			1	2	1	2	1	2
1	Ahmed Suhail.B	ECE	/	/	/	/	/	/
2	Ajas Ahamed.F	ECE	/	/	/	/	/	/
3	Bharanidaran.I	ECE	/	/	/	/	/	/
4	Bharath.B	ECE	/	/	/	/	/	/
5	Dhanush.S	ECE	/	/	/	/	/	/
6	Elamathi.A	ECE	/	/	/	/	a	a
7	Gurushithpriyan.V	ECE	/	/	/	/	/	/
8	Hasan Fazil Ansari.S	ECE	/	/	/	/	/	/
9	Iniyaa.J	ECE	/	/	/	/	/	/
10	Jagadeeswar	ECE	/	/	/	/	/	/
11	Jerose Ashiyar.J	ECE	/	/	/	/	/	/
12	Karan Raj.R	ECE	/	/	/	/	/	/
13	Karthik .S	ECE	/	/	/	/	/	/
14	Kavin.M	ECE	/	/	/	/	/	/
15	Mithilesh Vinayak.K	ECE	/	/	/	/	/	/
16	Mohamed Alif Fazil.K	ECE	/	/	/	/	/	/
17	Mohamed Ashbak Parvesh	ECE	/	/	/	/	/	/
18	Mohamed Rafeek.K	ECE	/	/	/	/	/	/
19	Mohamed Raiyan Hussain.A	ECE	/	/	/	/	/	/
20	Mohamed Sabir.S	ECE	/	/	/	/	/	/
21	Mohamed Sajith.S	ECE	/	/	/	/	/	/
22	Mohamed Thoufiq.S	ECE	/	/	/	/	/	/
23	Naren Kumar.N	ECE	/	/	/	/	/	/
24	Nihal.F	ECE	/	/	/	/	/	/
25	Nilofar Nisha.A	ECE	/	/	/	/	/	/
26	Nityasri.E	ECE	/	/	/	/	/	/
27	Praveen Kumar.S	ECE	/	/	/	/	/	/
28	Praveen.M	ECE	/	/	/	/	/	/
29	Priya.M	ECE	/	/	/	/	/	/
30	Reshma.S	ECE	/	/	/	/	/	/
31	Riyas.K	ECE	/	/	/	/	/	/
32	Sabarivasan.S	ECE	/	/	/	/	/	/
33	Sam Moses	ECE	/	/	/	/	/	/
34	Santhosh Raja.R	ECE	/	/	/	/	/	/
35	Sathesh Kumar.J	ECE	/	/	/	/	/	/

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (O.M.R)  
Sipcot, IT Highway Egattur  
Chennai - 603103



DEPARTMENT OF SCIENCE AND HUMANITIES  
SECTION E ( CIVIL/MECH/EEE)

S.NO	NAME	DEPT	07.11.2022		08.11.2022		09.11.2022	
			1	2	1	2	1	2
1	Kamalesh.J	CIVIL	/	/	/	/	/	/
2	Mohamed Niyas.A	CIVIL	/	/	/	/	/	/
3	Rahman Khan.R	CIVIL	/	/	/	/	/	/
4	Syed Masthan.S.A	CIVIL	/	/	/	/	/	/
5	Harish Adithya.M	EEE	/	/	/	/	/	/
6	Mohamed Halith.A	EEE	/	/	/	/	/	/
7	Mohamed Haris.A	EEE	/	/	/	/	/	/
8	Mohammed subair.J	EEE	/	/	/	/	/	/
9	Mohamed Suhail.J	EEE	/	/	/	/	/	/
10	Udhayabharathi.S	EEE	/	/	/	/	/	/
11	Umar Faruk.M.A	EEE	/	/	/	/	/	/
12	Abdul Rahuman.K	MECH	/	/	/	/	/	/
13	Ahamed Suhaib.A	MECH	/	/	/	/	/	/
14	Buhari Naveeth	MECH	/	/	/	/	/	/
15	Dinesh Kumar.S	MECH	/	/	/	/	/	/
16	Faizal.M	MECH	/	/	/	/	/	/
17	Mohamed Irfan.J	MECH	/	/	/	/	/	/
18	Mohamed Sarhan.K	MECH	/	/	/	/	/	/
19	Mohamed Ubais.J	MECH	/	/	/	/	/	/
20	Mohana Sundareshwar.A	MECH	/	/	/	/	/	/
21	Niyas Ahamed.M	MECH	/	/	/	/	/	/
22	Sulthan Mashud.G	MECH	/	/	/	/	/	/
23	Syed Mohammed Nasrula	MECH	/	/	/	/	/	/

Jan Nov Dec Sat Sat. Ches

Signature of the HOD (S & H)

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

2.2.1

From  
The HOD,  
Department of Civil Engineering,  
MSAJCE

To  
The Principal,  
MSAJCE,  
Chennai

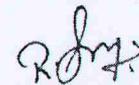
Permitted  
19/04/23

Respected Sir,

**Sub: Guest Lecture on Green Building and LEED Rating systems – Reg.**

With reference to the above subject, the department wishes to organise a Guest Lecture on the topic “Green Building and LEED Rating systems” on 27-04-2023. The session will be handled by Mr.M.Shahul Hameed, Senior CADD Trainer & Founder member, Career Forum-CADD training Service Trichy. So I kindly request you to grant permission to organise the above mentioned event.

Thanking You



Yours Sincerely,

(R.SOMESWARAN)

Place: MSAJCE

Date: 19/04/23



PRINCIPAL

Mohamed Sathak A.J. College of Engineering  
No.64, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

Since the topic is related to "ESS" subject  
I kindly request permission to allow all  
the second year students to attend the  
Guest lecture.

### Event budget proposal

Event type	Title of the Event	Date	Resource Person	Budget
Guest Lecture	Green Building and LEED Rating systems	27-04-2023	Mr.M.Shahul Hameed, Senior CADD Trainer & Founder member, Career Forum-CADD training Service Trichy.	Rs.1400

### Budget details (in Rupees)

Transport Charges : 1000/-

Memento : 400/-

TOTAL : Rs. 1400/-

  
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Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



**MOHAMED SATHAK**  
**A.J. COLLEGE OF ENGINEERING**  
34, Rajiv Gandhi Salai (OMR), Siruseri IT Park, Chennai - 603 103.



Ref.No: MSAJCE/ CIVIL/EVEN/2022-2023

DATE: 26-04-2023

**CIRCULAR**

It is hereby informed that Department of Civil Engineering is organizing a guest lecture on the topic "Green Building and LEED Rating systems" on 27-04-2023 at 11.00am. All students and faculty members are requested to participate in this event.

**Resource Person: Mr.M.Shahul Hameed,**  
**Senior CADD Trainer & Founder member,**  
**Career Forum-CADD training Service, Trichy.**  
**Venue : Mercury Hall(405)**

**Copy to:**

All HoDs  
IQAC

Rdy  
26/4/23  
HoD

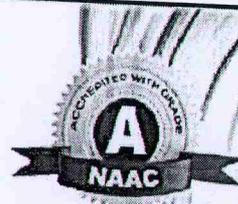
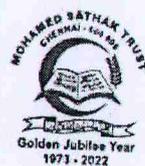
**PRINCIPAL**

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

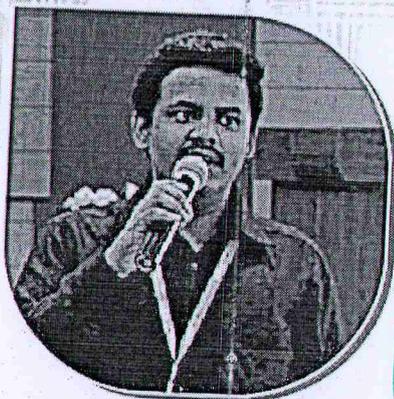
34, Rajiv Gandhi Salai (OMR), Siruseri IT Park, Chennai - 603 103.



## Department of Civil Engineering

Organizes

### A GUEST LECTURE ON GREEN BUILDING & LEED RATING SYSTEM



Resource person

**M. Shahul Hameed**

Senior CADD Trainer & Founder Member  
Career Forum - CADD Training Service  
Trichy

On

27.04.2023 | Thursday | 10.00 am to 01.00 pm

Venue: Mercury Hall

Mrs. V. Janaki  
AP / Civil  
Coordinator

Dr. Mohamed Adil Haque  
HoD / Civil | PG  
Convenor

Dr. R. Someswaran  
HoD / Civil  
Convenor



Mrs. V. JANAKI Asst.Prof - CIVIL &lt;civil.janaki@msajce-edu.in&gt;

## Guest Speaker for Guest lecture on "Green Building and LEED System"-Reg

3 messages

Mrs. V. JANAKI Asst.Prof - CIVIL <civil.janaki@msajce-edu.in>  
To: "lect.shahulcivil@gmail.com" <lect.shahulcivil@gmail.com>

Wed, Apr 26, 2023 at 11:46 AM

Department Civil Engineering at Mohamed Sathak AJ College of Engineering has planned to conduct a Guest lecture on " Green Building and LEED System" on 27-04-2023.

I would like to invite you to be our guest speaker for the event.

We very much look forward to your response.

Thank you.

--  
With Regards,  
Mrs.V.Janaki,  
Assistant Professor,  
Department of Civil Engineering,  
Mohamed Sathak A.J. College of Engineering,  
Mobile No. +91 7404242105

Shahul Hameed <lect.shahulcivil@gmail.com>  
To: "Mrs. V. JANAKI Asst.Prof - CIVIL" <civil.janaki@msajce-edu.in>

Wed, Apr 26, 2023 at 4:41 PM

I accept the invitation.

[Quoted text hidden]

Shahul Hameed <lect.shahulcivil@gmail.com>  
To: "Mrs. V. JANAKI Asst.Prof - CIVIL" <civil.janaki@msajce-edu.in>

Thu, Apr 27, 2023 at 6:42 AM

I accept the invitation.

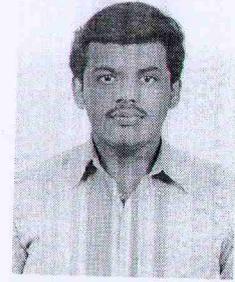
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--  
WITH REGARDS....

M.SHAHUL HAMEED  
Research Scholar  
National Institute of Technical Teachers' Training and Research  
Chennai.  
MOBILE NUMBER : 9344520180.

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

M .Shahul Hameed.  
S/O S.Mohamed Hanifa,  
44,Ashok Nagar,  
Natham,Dindigul(Dist)- 624401  
Tamilnadu ,India.  
Contact No: 9344520180  
Email ID: [lect.shahulcivil@gmail.com](mailto:lect.shahulcivil@gmail.com)



### Objective

To lead a career in a challenging environment where I can utilize and enhance my creative skills and engineering skills so that I can achieve complete satisfaction by serving the organization and the society which I'm a part of.

### Educational Qualification

S. NO	QUALIFICATION	INSTITUTION	YEAR OF PASSING	CLASS
1.	Ph.D (CIVIL ENGINEERING)	NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING & RESEARCH- CHENNAI (Full Time Research Scholar )	Pursuing	-
2.	M.E (ENVIRONMENTAL ENGINEERING)	ANNA UNIVERSITY ( BIT Campus )	2013-2015	FIRST CLASS
3.	B.E. (CIVIL ENGINEERING)	KARPAGAM ACADEMY OF HIGHER EDUCATION COIMBATORE.	2009 -2013	FIRST CLASS WITH DISTINCTION
4.	HSC	LANDIS MATRICULATION HIGHER SECONDARY SCHOOL, NATHAM, DINDIGUL DIST.	2008-2009	FIRST CLASS

### Area of Interest

- Research in Environmental Engineering field.
- Civil Engineering Software's

### Fellowships

- Ministry of HRD Fellowship for Research Studies (Ph.D.) at NITTTR – Chennai .
- Ministry Of Minority Affairs - Merit-cum-Means Scholarship Scheme for PG Studies (M.E.) at Anna University

### In-plant Training undergone

1. Worked as a project student in CSIR – CECRI (Central Electro Chemical Research Institute) , karikudi, India, under the guidance of Dr .Udaya bhanu,

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No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



- **Decolouration of Orange G Dye by MicroOrganism.**
- **Experimental study on Paver Blocks and Cement Bricks with E-Waste.**
- **Planning and Designing of circular water tank for K. Ramakrishnan college of technology, Tamil Nadu, India.**
- **Planning and Designing of Drinking water supply system for thuvankurichi village.**
- **Planning and Designing of Rectangular water tank for samayapuram, Trichy, Tamil Nadu, India.**
- **Experimental investigation on manufacturing of Bricks using foundry sand & M-Sand waste.**
- **Experimental investigation on manufacturing of plastic bricks by using Biomedical plastic waste.**

### Journal Publications

- **Analysis of Water Quality parameters of surface water in Tiruchirappalli District, Tamil Nadu - India, published in International Journal of Engineering Research & Technology, ISSN 2278-0181, Volume 4, Issue 25 in the year 2016.**
- **An Experimental investigation on Treatment of Tannery waste water by electro coagulation, published in International Journal of SSRG, ISSN 2348-8352 in year of 2016.**
- **Bio-ethanol and Citric Acid Production from Banana Peel and Pineapple Peel by Fermentation Process, published in International Journal of Engineering Research & Technology, ISSN 2278-0181, Volume 4, Issue 25 in the year 2016.**
- **Bio-Degradation of Orange G dye using Microbial Action, published in International Journal of Engineering Research & Technology, ISSN 2278-0181, Volume 4, Issue 25 in the year 2016.**
- **Experimental study on removal of chromium in water, published in International Research Journal Of Engineering Sciences, ISSN 2394-983X, volume 3, issue 2 in the year 2017.**
- **Evaluation Of Cost Effective Sewage Treatment Plant For Augmentation Of Irrigation Water Supply In Sular Small Tank, Sular, Published in International Journal of Advance Research and Innovation, ISSN 2347 - 3258, in the year 2018.**
- **Designing Of Power Generation Plant From Land Fill Gas (Bio Fuel), published in International Journal of Advance Research and Innovation, ISSN 2347 - 3258, in the year 2018.**

*Handwritten signature*  
**PRINCIPAL**  
 Mohamed Salar J. College of Engineering  
 No.34, Rajiv Gandhi Road, (MIR)  
 Egattur, Chennai - 600047

## Patent

- Patent applied on Polymer Insulated Reinforced Wall Structure.

## Software Skills

- AUTOCAD (Drafting Tool)
- STAAD.PRO (Design & Analysis Tool)
- REVIT ARCHITECTURE (3D modeling Tool)
- ARCHICAD (3D modeling Tool)
- PRIMAVERA (Project Planning Tool)
- MSP (Project Planning Tool)
- QUANTITY TAKEOFF (Building Estimation & Costing Tool)
- QGIS (Mapping Tool)

## Achievements / Awards:

- I received 2 times **HRM Award** for “**BEST PERFORMANCE**” in K.Ramakrishnan College of technology, Trichy in the academic year 2015 –2016 & 2016-2017.
- I received Meritorious Award for “**BEST PERFORMANCE**” in K.Ramakrishnan College of technology, Trichy in the academic year 2016-2017.
- I received 4 times proficiency in my University for **Best Outstanding Student** during **UG** studies (2009 - 2013).
- I received Appreciation Certificate for **100% Attendance** during the academic year of 2010 – 2011 in UG studies.
- I received award for **expertise in STAAD Pro software**, awarded by **Country Head of CADD Center Training Services Pvt, Ltd** in July 2014.
- I received **position 1 for STAAD.pro software** in Tamil Nadu- India, Region for actively participates in Tech Forum Contest awarded by **vice president of CADD center training services Pvt. Ltd** in Dec 2014.

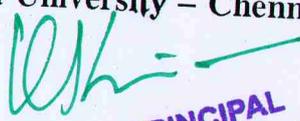
  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

### Professional Bodies Memberships

1. Life Member (LM111558) in "THE INDIAN SOCIETY FOR TECHNICAL EDUCATION"
2. Life Member (AM10100054327) in "INSTITUTE OF RESEARCH ENGINEERS AND DOCTORS"
3. Life Member (164332) in "INTERNATIONAL ASSOCIATION FOR ENGINEERS"

### Technical Skills

1. Presented a paper on "Treatment of tannery waste water by Electrocoagulation method in *International conference* conducted in Latha Mathavan college of Engineering, Madurai, India.
2. Presented a paper on "Treatment of azo-dye by aloe vera gel as a Bio adsorption" in *International conference* conducted in Latha Mathavan college of Engineering, Madurai, India.
3. Presented a paper on "Analysis Of Water Quality Parameters of Surface Water In Tiruchirapalli District, Tamil Nadu, India" in *National conference* conducted in M. Kumarasamy of Engineering, Karur, India.
4. Presented a paper on "Bio Ethanol and Critic Acid Production by Fermentation process" in *National conference* conducted in Kongunadu College Of Engineering, Trichy, India.
5. Presented a paper on "Statistical Analysis of Water Quality Parameters" in *National Conference* conducted in Kongunadu College of Engineering, Trichy, India.
6. Presented a paper on "Decolouration of orange G dye by micro organism" in *National conference* conducted in Kongunadu College of Engineering, Trichy, India.
7. Presented a paper on "power generation through double chamber MFC operation from industrial waste water" in *National conference* conducted in Nadar Saraswathi College of Engineering & technology, Theni, India.
8. Presented a paper on "Evaluation Of Cost Effective Sewage Treatment Plant For Augmentation Of Irrigation Water Supply In Sular Small Tank, Sular" in *National conference* conducted in MAM College of Engineering & technology, Trichy, India.
9. Presented a paper on "Designing Of Power Generation Plant From Land Fill Gas (Bio Fuel)," in *National conference* conducted in MAM College of Engineering & technology, Trichy, India.
10. Presented a paper on "Extracting Heavy Metals Using Natural Coagulant & Influencing Oxygen Demand In Rotating Biological Contactor Method" in *National conference* conducted in M. Kumarasamy of Engineering, Karur, India.
11. Participated seven days FDTP on Applied Hydraulic Engineering, organized by Center for faculty Development - Anna University - Chennai in University College of Engineering, Ariyalur, India.

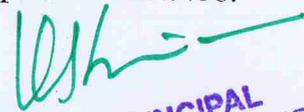
  
**PRINCIPAL**  
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No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



29. Participated 25<sup>th</sup> IPHE National convention on Environmental Engineering And 3<sup>th</sup> International conference and Exhibition ENVISION 2015 organized by IPHE and CSIR - Center Leather Research Institute , Adyar ,Chennai.,India
30. Participated conference on cleaner Technologies for water and wastewater ,organized by National Institute Of Technology , Trichy ,India
31. Participated seminar on Recent Trends In Irrigation Engineering Organized By Anna University Bit Campus. Trichy,India.
32. Paper presentation on “ GIS as a tool of Air Quality Management” in International Techno Meet organized by Info institute of Engineering , Coimbatore India.
33. Participated National Level One Day Work Shop on Meticulous Application of structural engineering software's organized by Sri Krishna College of Technology,India.
34. Participated National Level One Day seminar on Transportation system organized by K.Ramakrishnan College of Technology,Trichy,India.
35. Participated National Level One Day seminar, Sponsored by AICTE on current trends , prospects & challenges of Swachh Bharat organized by K.S.R college of Technology, naamakkal ,India.
36. Participated National Level One Day seminar, Sponsored by CSIR on utilization of solid waste organized by K.Ramakrishnan College of Technology,Trichy,India

### Program Organized

1. Organized one day guest lecture on “Secondary treatment of sewage” on 14.02 .2018
2. Organized one day guest lecture on “ Construction Materials ” on 21.02 .2018
3. Organized one day National workshop on “Understanding solid waste Management Practices “on 21.02.2018
4. Organized one day National workshop on “Understanding of waste water treatment technology & Green Environment “on 20.09.2017
5. Organized one day guest lecture on “Advanced water treatment ” on 9.09.2017
6. Organized one day guest lecture on “Social issue & its Environment ” on 31.08.2017
7. Organized one day guest lecture on “Applied Hydraulic Engineering” on 1.04.2017
8. Organized 5 days Workshop on “Total Station” in K,Ramakrishnan college of technology, Trichy ,Tamil Nadu , India. (9.2.2017 to 12.2.2017).
9. Organized one day guest lecture on “Water Resource And Irrigation Engineering” on 17.09.2016
10. Organized One Day National Level Technical Symposium on 9.9.16.
11. Organized Technical Quiz program on 14.8.15

  
**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (O.M.R)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

### Job Responsibility

- Handle lecture class for UG students.
- NAAC - Department coordinator.
- HRM - Department coordinator.
- AICTE / Anna University Affiliation - Department coordinator.
- Research & Development - Department coordinator.
- Professional Bodies Membership - Department coordinator.
- Chair person for 11 years.
- Environmental Engineering lab – Incharge.
- Department library – Incharge.
- Projects supervisor.
- Assistant Class Advisor

### Subjects / Labs Handled

- Environmental Engineering –I
- Environmental Engineering –II
- Environmental Science And Engineering
- Water Resource And Irrigation Engineering
- Applied Hydraulics Engineering
- Basic Civil And Mechanical Engineering
- Construction Materials
- Advanced Construction Technology
- Computer Aided Designing And Building Drawing Lab
- Environmental Engineering Lab
- Hydraulic Engineering Lab
- Design Project.

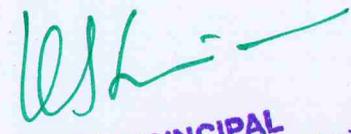
  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (Old)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

## Guest performance

- I nominated as a **Member for Board of Studies** in Civil Engineering Department, Karpagam academy of higher Education Coimbatore – India in the academic year of 2016 –2017.
- **Guest speaker in Prathyusha Engineering College – Chennai** on Awareness of **Green Environment** which is organized by Eviro club - **Prathyusha Engineering College – Chennai** , in the academic year of 2019-2020
- **Guest judge** for the Event of **CADD Modeling** for the National Level Technical symposium organized by Department of Civil Engineering, **Government College of Engineering** ,Srirangam- India in the academic year of 2016 –2017.
- **Lecture talk on Green Environment** as a **Resource person** in National workshop on “**Understanding Waste water treatment technology & Green Environment**” in K.Ramakrishnan college of technology in the academic year of 2017-2018
- **Guest speaker in BHEL- Trichy on Green Environment & Green buildings** which is organized by **The Institution of Engineers (India), Trichy local Center** in the academic year of 2017-2018

## Personal Details

Name : M.ShahulHameed  
Father'sName : S.MohamedHanifa  
Mother'sName : M. Faridha Begam  
Date of Birth &Age : 27/04/1992 & 27  
BloodGroup : B+  
Gender : Male  
Nationality : Indian  
Religion : Muslim  
Languagesknown : English,Tamil.

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Chennai - 603103.

## Declaration

I hereby declare that all the details furnished above are true to my knowledge and I owe all the responsibilities for proving their authenticity, in case needed.

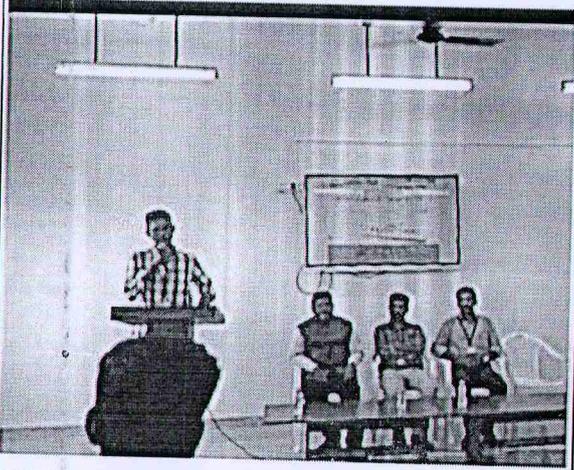
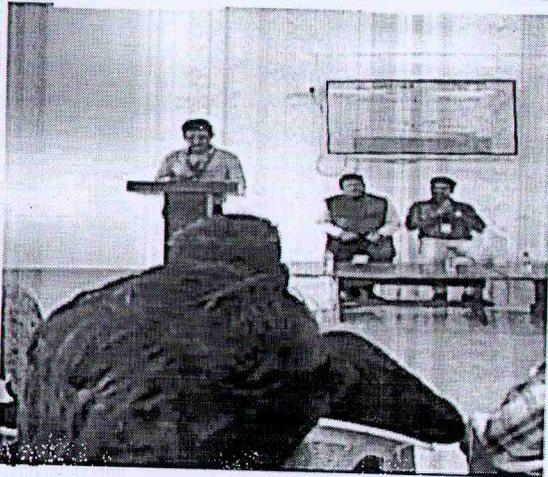
Place : Chennai,India

Yoursfaithfully

Date : / /

  
(M.Shahul Hameed)

## REPORT ON GUEST LECTURE

<b>Department</b>	Civil Engineering	
<b>Type of Event</b>	Guest Lecture	
<b>Event Title</b>	Green Building And LEED Rating System	
<b>Date &amp; Time</b>	27-04-2023 & 11am to 1.00pm	
<b>Venue/Mode</b>	Mercury Hall (Room. 405)	
<b>Organizer</b>	Civil Department	
<b>Coordinator</b>	Mrs. V.Janaki, Assistant Professor/Civil	
<b>Profile of the Chief Guest</b>	Name of the Guest Speaker(s)	<b>Mr.M.Shahul Hameed</b> <b>Senior CADD Trainer &amp; Founder member</b> <b>Career forum-CADD Training Service</b> <b>Trichy</b>
<b>Write-up on Event</b>	<p>Department of Civil at Mohamed Sathak AJ College Engineering organized Guest Lecture on "Green Building &amp; LEED Rating System" on 27-04-2023 (Thursday) at 11.00am. Venue Mercury Hall. This session started with Qirath by Habeeb Musthafa, III Year civil. Dr.R.Someswaran (HOD/Civil) then welcomed The Guest Speaker Mr.M.Shahul Hameed, Senior CADD Trainer &amp; Founder Member Career forum-CADD Training Service Trichy, and Mrs.V.Janaki (AP/Civil) delivered the welcoming address. Dr. A. Balakrishnan, Head Academic, then presented the Chief Guest with a shawl in honor. The speaker explains Environmental Engineering, Biodiversity, Genetic diversity, Spices diversity, Ecosystem diversity, Social values, Artificial light pollution, plastic neighborhood, Green Building, Certifying agencies in India, Energy efficient, water efficient, LEED India and discussed about EXNORA. Then the program came to an end by delivering vote of thanks.</p>	
		
	Qirath by Habeeb Mustafa (III year Civil)	Welcome Speech by Dr.R.Someswaran (HOD/Civil)

*Ush*

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Chennai - 603103.



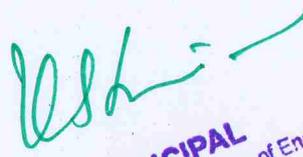
Welcome Address by  
Mrs. V. Janaki (AP/Civil)



Dr. A. Balakrishnan, Head Academic  
Honoring the chief guest



Some of the photographs while delivering the lecture

  
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Chennai - 603103.



MOHAMED SATHAK A J COLLEGE OF ENGINEERING , Chennai-603 103

VISITOR FEEDBACK

Department: *Civil*

Academic Year: *2023*

Name of the Guest	<i>M. SHAHUL HAMEED</i>
Organization Details	<i>CAREER FORUM, CADD-Training Services - Trichy</i>
Mail id & Contact no.	<i>lect.shahulcivil@gmail.com / 9344520160</i>
Purpose of Visit	<i>GL / Seminar / Workshop / Conference / R&amp;D / FDP / External Examiner / AUR / Management / Cultural / others</i>
Beneficiary- Department / Year - if applicable	<i>Civil / 2023</i>
Date of Visit	<i>27/04/2023</i>
How would you rate the student Interaction	<i>Excellent / Good / Average</i>
How would you rate the faculty Interaction(if any)	<i>Excellent / Good / Average</i>
Comments on facilities of the college	<i>* Well organized * Good students interaction. * Well Planned by faculty increase.</i>
General Remarks	<i>Good infrastructure.</i>
Scope for Collaborative work with your organisation	<i>CADD Training, Value added Courses.</i>
Area in which collaborative work can be done	<i>Civil Engineering Softwares.</i>

*V. Janaki*  
Name & Signature of Coordinator

Format No : FB 07

[V. JANAKI]

*M. Sathak*

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Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

Rev. No : 1.0

*M. Sathak*  
*27/4/23*

Signature of Guest

Rev. Date : 04.01.21

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

STUDENT FEEDBACK ON GL / SEMINAR / WORKSHOP

Department: CIVIL

Academic Year: 2023 - 2024

Name of the Student	M. Mohamed Jassim
Year/Sem	III <sup>rd</sup> yr / VI <sup>th</sup> sem
Name of the Guest	Shahul hameed
Name of the Institution/ University/ Industry/R&D Organization.	
Event	GL/Seminar/Workshop/Conference/Others
Date of Event	29/04/2023
Was the session Useful?	Its good to know more knowledge of green environment
Expert Interaction	Excellent / Good / Average
Whether the lecture was related to Subject? If yes mention the subject	Green Building
Brief Summary/Report of the topic	
General Remarks	

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Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

*(Handwritten signature in black ink)*  
Signature of Student  
Rev. Date : 04.01.21

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

STUDENT FEEDBACK ON GL / SEMINAR / WORKSHOP

Department: CIVIL

Academic Year: 2022-2023

Name of the Student	M. Raees Ahmed
Year/Sem	III <sup>rd</sup> yr - 5 <sup>th</sup> sem
Name of the Guest	Shahul hameed
Name of the Institution/ University/ Industry/R&D Organization.	Mohamed Sathak A-J College of Engineering
Event	GL/Seminar/Workshop/Conference/Others
Date of Event	27/04/23
Was the session Useful?	Yes
Expert Interaction	Excellent / Good / Average
Whether the lecture was related to Subject? If yes mention the subject	Green Buildings
Brief Summary/Report of the topic	Useful for our studies and research works
General Remarks	

*(Handwritten signature in green ink)*

*(Handwritten signature in black ink)*

Signature of Student

Form No: FB 01

Rev. No: 1.0

**PRINCIPAL** Rev. 04.01.21  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

STUDENT FEEDBACK ON GL / SEMINAR / WORKSHOP

Department: BE CIVIL ENGINEERING

Academic Year: 2022 - 2023

Name of the Student	SANDESH KUMAR . K
Year/Sem	2 <sup>ND</sup> YEAR / 4 <sup>TH</sup> SEM
Name of the Guest	
Name of the Institution/ University/ Industry/R&D Organization.	MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING.
Event	GL/Seminar/Workshop/Conference/Others
Date of Event	07/04/2023
Was the session Useful?	YES. It delivers the clear ideas about the concept 'Green Building'!
Expert Interaction	Excellent / Good / Average
Whether the lecture was related to Subject ? If yes mention the subject	YES. ESS - Environmental Science & Sustainability
Brief Summary/Report of the topic	
General Remarks	It was an appreciated Seminar on the concept "Green Building."

Format No: FB 01

Rev. No : 1.0

*[Handwritten Signature]*

*[Handwritten Signature: Sandesh Kumar]*  
Signature of Student

Rev. Date : 04.01.21

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

From  
The HOD,  
Department of Civil Engineering,  
MSAJCE

To  
The Principal,  
MSAJCE,  
Chennai

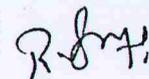
Permitted  
A  
on  
04/04/23

Respected Sir,

**Sub: Webinar on Industrial Design – Reg.**

With reference to the above subject, the department wishes to organise a Webinar on the topic “Structural design of industrial buildings” on **05-05-2023**. The session will be handled by Winfra Technical Consultant, Chennai. So I kindly request you to grant permission to organise the above mentioned event.

Thanking You



Yours Sincerely,

Place: MSAJCE

Date: 04.04.2023

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



Mrs. V. JANAKI Asst.Prof - CIVIL <civil.janaki@msajce-edu.in>

## Structural Industrial Design Webinar on Friday, May 05

1 message

Projects Winfra <projects@winfra.tech>

Thu, Apr 13, 2023 at 3:09 PM

To: "Mrs. V. JANAKI Asst.Prof - CIVIL" <civil.janaki@msajce-edu.in>

Good afternoon,

We would like to inform you that a webinar on structural design of industrial buildings will be held on 05.05.2023 at 10:30 - 12:30 through Microsoft teams.

please be ready with your notebook and pen.

Meeting

Monday, May 1 · 5:00 – 6:00pm

Google Meet joining info

Video call link: <https://meet.google.com/zbm-cwxz-cby>

Best Regards

ARJUN LOHITHAKSHAN

Project Engineer | WINFra Technical Consultants

Mobile 956615402

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No.34, Rajiv Gandhi Salai (OMR)  
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Chennai - 603103.



**MOHAMED SATHAK  
A.J. COLLEGE OF ENGINEERING**

34, Rajiv Gandhi Salai (OMR), Siruseri IT Park, Chennai - 603 103.



**Department of Civil Engineering**

Organizes

WEBINAR ON  
**STRUCTURAL DESIGN OF  
INDUSTRIAL BUILDINGS**

Resource person

**Mr. Anoop Baby**

Managing Director - Winfra

 Google Meet Link

<https://meet.google.com/zbm-cwxz-cby>

On

05.05.2023 | Friday | 10.30 am to 12.30 pm

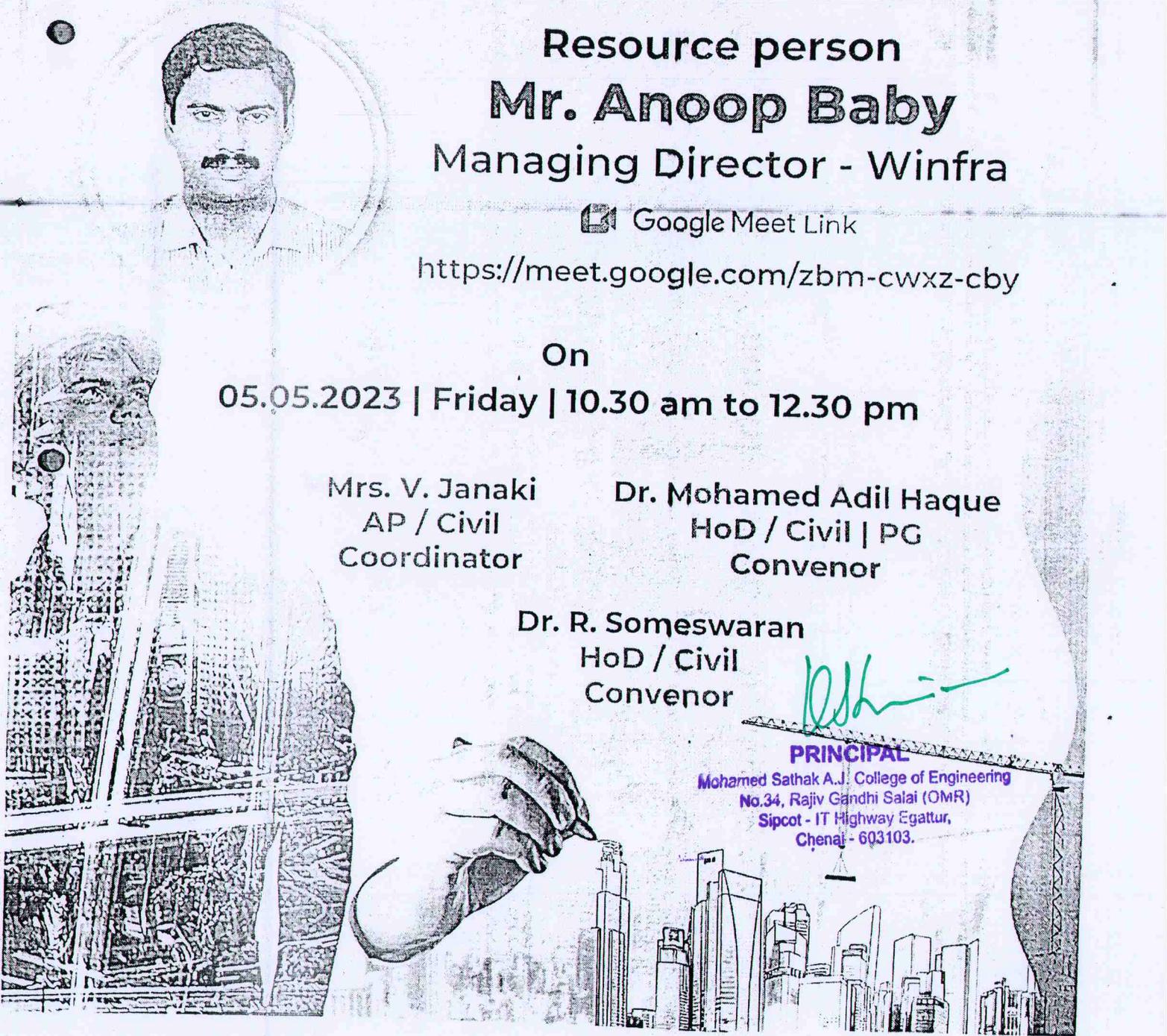
Mrs. V. Janaki  
AP / Civil  
Coordinator

Dr. Mohamed Adil Haque  
HoD / Civil | PG  
Convenor

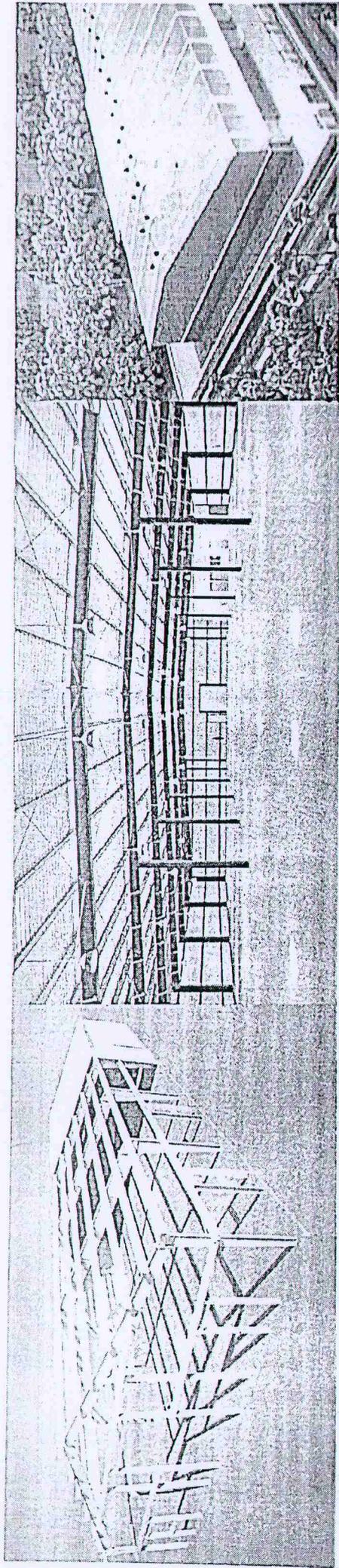
Dr. R. Someswaran  
HoD / Civil  
Convenor

  
**PRINCIPAL**

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



A Winfra Technical Consultants Initiative..



Click The Below Link For Registration

<https://forms.gle/cHzQ7aZFGaGezbQm6>

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No. 1, Rajiv Gandhi Salai (Old)  
Sector - IT Highway Egattur,  
Chennai - 603103.



# ANOOP BABY

PULIMOOTTIL HOUSE THIRUVANKULAM PO,  
ERNAKULAM, KERALA, PIN - 680305, INDIA.  
MOBILE # +91-9566154023  
EMAIL: anoop@winfra.tech



## EXPERIENCE

17 years of Experience as Engineering Manager in Civil & Structural Engineering, possessing a good understanding of Structural Analysis and Design of Infrastructure, Energy Offshore /Onshore Oil & Gas Steel Structures and their foundations.

## EDUCATION

Degree, with Branch/Specialization	University	Period	CGPA/ Percentage
M. Tech., Computer Aided Structural Engineering	Mahatma Gandhi University Kottayam, Kerala	MAY 2005 – Jul 2006	7.9/10
B.Tech., Civil Engineering	Anna University, Tamilnadu	Aug 2001 – Mar 2005	76%

Organization	Position Held	Years
Winfra Technical Consultants	Project Manager	1,0
Marmag Infra Pvt LTD	Engineering Manager	3,0
Marvel Structural Consultants	Manager Projects/Business	3,0
Oiltech Engineering India Pvt Ltd	Lead Structural Engineer	3,0
Mcdermott International	Senior Structural Engineer	1,0
Saipem India Pvt Ltd	Senior Structural Engineer	1,5
Foster Wheeler Energy Limited	Senior Structural Engineer	3,5
BGR Energy Limited	Structural Engineer	1,0
KITCO -Cochin	Site Engineer	1,0

## PROJECTS MANAGED

Factory Buildings, Steel buildings and Concrete infra structures for the prominent clients like Hyundai, DLF, Eversendai, TATA Power, TATA Projects, TEBODIN, Petrofac, IIT Madras

ENI ANGOLA 1506 FPSO TOPSIDE STRUCTURAL LEAD.

Eni Italy

SAFANIYA Oil Field Auxiliary Jackets and Topsides

Saudi Aramco, Saudi Arabia

KARAN Oil Field Auxiliary Jackets & Topsides

Saudi Aramco, Saudi Arabia

MRJN Oil Field Auxiliary Jackets & Topsides

Saudi Aramco, Saudi Arabia

APACHE BALNAVES FPSO Topside and Deck Connection

Apache Corporation, Australia

ONGC DI FPSO Topside and Deck Connection

Oil and Natural Gas Corporation Limited, India.

MATIX FERTILIZER PLANTS

Matix fertilizers. India Ltd., SINGAPORE PARALLEL TRAIN EXXON MOBIL

Exxon Mobil Singapore.

PLUTO LNG WOODSIDE

Wood side Australia.

**PRINCIPAL**

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IOCL PARADIP REFINARY  
Indian Oil Corporation Limited.

SL NO	LIST OF SOLAR PANEL CLIENTS
1	VSM Energy Consultancy Services
2	TATA Steel
3	VRM Energy PVT. LTD
4	Nordic INDIA
5	KCP Solar Industry
6	ALECTRONA Energy Private Ltd
7	ANCHOR ELECTRICALS PVT. LTD
8	Atria Power
9	JUNNA SOLAR SYSTEMS Pvt. Ltd.
10	SRI SAVITR SOLAR PVT. LTD.

#### COMPUTER PROFICIENCY

Software: SACS, MICROSAS, STAAD -Pro, SAP2000, ETABS, FEMAP, ABAQUS, MS Office, PRIMAVERA, MS PROJECT

#### PERSONAL INFORMATION

Date of Birth: Aug06, 1983

Status: Married

Nationality: Indian

Languages Known (read, write and speak): English, Hindi, Tamil and Malayalam



**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No. 34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

Registered.

Timestamp	Email Address	Degree	Name	Year	Semester	Contact Number
5/3/2023 13:55:40	faizalmohamed5228@gmail.com	UG	A.moahmed faizal	II	4	83447 97374
5/3/2023 13:56:20	mohammedyusuf91102@gmail.com	UG	A.Mohamed Yusuf Arshath	III	6th	7550380983
5/3/2023 14:08:41	logeshwaran14722@gmail.com	UG	Logesh waran.p	III	6	6385100778
5/3/2023 14:15:03	musthubinjara@gmail.com	UG	Musthaq	III	6th	9629553441
5/3/2023 15:30:37	pk0460234@gmail.com	UG	K PRADEEPKUMAR	III	6	8939467159
5/3/2023 15:39:26	mdjassim31122001@gmail.com	UG	M.Mohamed jassim	III	6	8012203442
5/3/2023 15:46:57	veerakumar18104115@gmail.com	PG	M.VEERAKUMAR	IV	8	6379164018
5/3/2023 16:47:38	yogaraj9800@gmail.com	UG	Yogaraj.M	III	06	9345289800
5/3/2023 17:04:23	mhdkaif2002@gmail.com	UG	MOHAMED KAIF M	II	Fourth	6380591408
5/3/2023 19:02:06	natheemansoor786@gmail.com	UG	Mohamed natheem mansoor	IV	8	8056474491
5/3/2023 20:23:38	srikameshwar99@gmail.com	UG	Sandesh Kumar K	II	4th	9940342437
5/5/2023 10:58:24	rksomes@gmail.com	PG	R.Someswaran	IV	Sem	9706572154
5/5/2023 11:00:25	raseedahamed00@gmail.com	UG	Raseed Ahamed M	III	6	6380503445
5/5/2023 11:00:29	rajeshnagaraj17102001@gmail.com	UG	Rajesh N	III	6	8838740804
5/5/2023 11:01:08	mail2ahim06@gmail.com	UG	Mohamed Fahim.S	III	6	7598967151
5/5/2023 11:01:38	ahamedriswan217@gmail.com	UG	Ahamed riswan	III	6	8754702760
5/5/2023 11:02:20	mathesh1712@gmail.com	UG	SHANMUGAM.S	II	4th	7806815620

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Sipcot - IT Highway Egattur,  
Chenal - 603103.

Participants

11:48 58% 4G LTE

About this call

- | People                         | Info | Activities |
|--------------------------------|------|------------|
| In call                        |      |            |
| Mrs.JANAKI V (You)             |      |            |
| Projects Winfra Meeting host   |      |            |
| Projects Winfr... Meeting host |      |            |
| 3001 Habeeb ...                |      |            |
| 3003 RAJESH                    |      |            |
| 3307 Mohame...                 |      |            |
| 3308 MOHAME...                 |      |            |
| ADIL SIRAJ                     |      |            |
| Afsar Hameed.H                 |      |            |
| Emilreyan R                    |      |            |

No actions taken. Continuing in offline mode.

11:48 24% 4G LTE

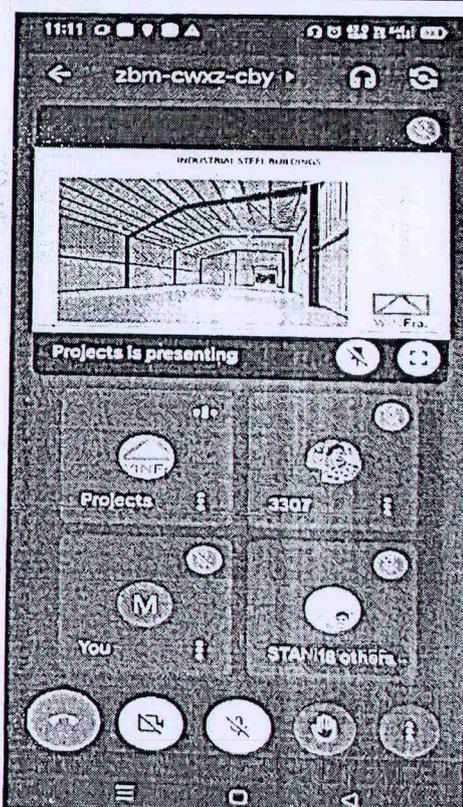
About this call

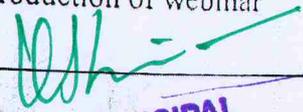
- | People           | Info | Activities |
|------------------|------|------------|
| Kavithra Padm... |      |            |
| Mohamed fahi...  |      |            |
| Mohamed Faizal   |      |            |
| Mohamed Har...   |      |            |
| MOHAMED KAIF     |      |            |
| Navaneetha Kr... |      |            |
| RASEED AHAM...   |      |            |
| relliss yogesh   |      |            |
| Shanmugam S      |      |            |
| Shazma Meha...   |      |            |
| Someswaran       |      |            |
| Someswaran       |      |            |
| Sri Kameshwar    |      |            |

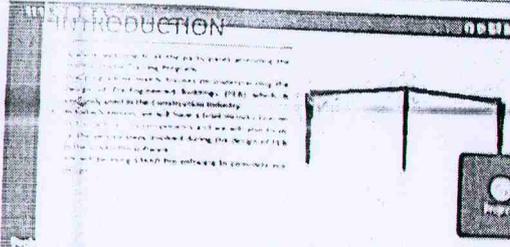
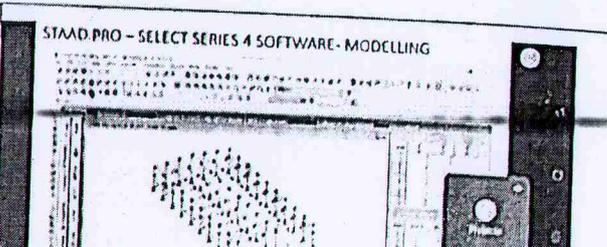
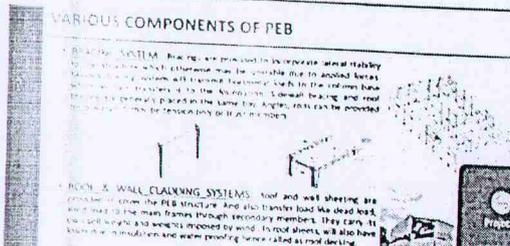
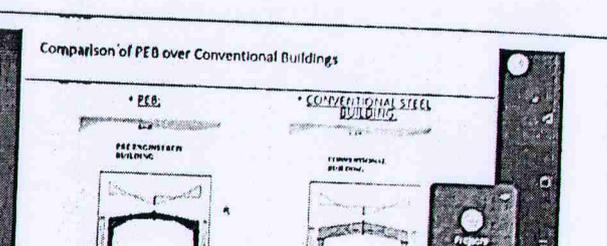
You

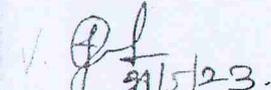
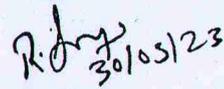
*[Handwritten Signature]*  
**PRINCIPAL**  
 Sathak A.J. College of Engineering  
 34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

## REPORT OF WEBINAR ON "STRUCTURAL DESIGN OF INDUSTRIAL BUILDING"

Department	Civil Engineering	
Type of Event	Webinar	
Event Title	Structural Design of Industrial Building	
Date & Time	05-05-2023 & 10.30am to 12.30pm	
Venue/Mode	G-Meet	
Organizer	Civil Department	
Coordinator	Mrs. V.Janaki, Assistant Professor/Civil	
Profile of the Chief Guest	Name of the Guest Speaker(s)	Mr. Anoop Baby Managing Director Winfra.
	<p>Department of Civil at Mohamed Sathak AJ College Engineering organized Webinar on "Structural Design of Industrial Building" on 05-05-2023(Friday) at 10.30am. Through G-Meet. Mrs.V.Janaki (AP/Civil) welcomed The Guest Speaker Mr.Anoop Baby, Managing Director, Winfra. and delivered the welcoming address. The speaker explains PEB(Pre Engineered Building), comparison of PEB over Conventional Concrete. Components in PEB system, processing of PEB. Event ended with vote of thanks.</p>	
Write-up on Event		
	Welcome Speech by Mrs. V.Janaki (AP/Civil)	Introduction of webinar

  
**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

		
	Introduction of PEB (Pre-Engineered Building)	Load analysis using Staad pro.
		
Some of the photographs while delivering the Weinar		

Prepared By :	Reviewed/Forwarded by:
Signature : 	
Name : Mrs. V. Janaki	Dr. R. Someswaran
Designation : Assistant Professor/Civil	HoD/Civil
Date : 31-05-2023	31-05-2023

  
**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

REPORT ON INDUSTRIAL VISIT

Department of Civil Engineering

Name of the Industry	Chennai Metro Rail Limited
Date of Visit	10.05.2023
Contact Person	Mr. J. Senthil, Chief Program Expert,
Target Audience and No of Students Participated	22 along with 2 faculties
Brief note about the Visit / Curriculum gap addressed : Concepts of Prestressing along with Prefabrication process was learned through the experts in the yard. Girders for Overhead bridges for Chennai Metro Rail Project were made in the yard by the method of Post-tensioning and Pre-tensioning method. At First, they provided safety aids for all visitors once completing the video session. The overall process was explained in sequence: collection of materials, testing of materials, transporting, placing and curing. Additionally, steel cutting and gantry girder operation was explained.	
Benefit and Knowledge Gained : Students learnt the Prestressing concept, advanced technique in civil engineering, which is the topic beyond the syllabus. Also gained knowledge in job opportunities in various field of Civil Engineering. The Site Visit was helpful in finding an idea of laying Metro Rail Line and Metro Station along the construction techniques.	
Relevance with Academic : Related to academic subjects namely Prefabrication Structures and Prestress Concrete.	

Supporting Document Required :  
1.Communication letters  
2.Students Report  
3.Photo

Faculty In-charge

Format no.: PLA 11

Rev.No: 1.0

Sign of the HoD with date

Rev.Date: 04.01.21

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



**MOHAMED SATHAK**  
**A.J. COLLEGE OF ENGINEERING**  
34, Rajiv Gandhi Salai (OMR), Siruseri IT Park, Chennai - 603 103.



DEPARTMENT OF CIVIL ENGINEERING

08/05/2023

SUBMITTED TO THE PRINCIPAL

*Permitted*  
*08/05/23*

Sub: One Day Visit – II & III Year Civil Engg. - Permission Requested – Reg.

We have planned to take the Second & Third Year Civil Engineering Students to Prefabricated Yard, Chennai Metro Rail project at Kolapakkam on 10<sup>th</sup> May 2023. In this regard, permission is kindly sought as students would be highly benefited by this visit.

Number of Students : 22

Accompanying Faculty : 1. Mrs.P.Kavithra Asst. Prof./ Civil  
2. Mr. Rakesh R Asst. Prof./ Civil

Date & Time of Departure : 10-05-2023 / 09.00 am

FACULTY INCHARGE

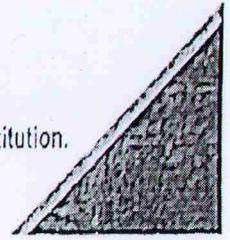
HOD / CIVIL

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai) ISO 9001:2008 Certified Institution.



From  
The HOD,  
Department of Civil Engineering,  
Mohamed Sathak A J College of Engineering,  
Chennai - 603103

To  
Mr. Archunan T,  
Director (Projects),  
Chennai Metro Rail Limited,  
Nandanam, Chennai- 600035

Respected Sir,

Sub: Seeking permission to Site Visit at Chennai Metro Rail Limited – Reg.

With reference to the above subject, Department of Civil engineering of Mohamed Sathak AJ College of Engineering wishes to organise an Industrial Visit at Chennai Metro Rail Limited for students to gain practical knowledge on advanced techniques adapted in recent construction practices. Totally 22 students are interested to the visit and they will be taken over by 2 faculty members. So I kindly request you to grant permission to visit your site.

Thanking You

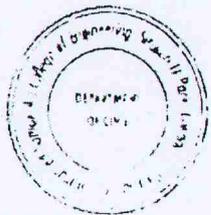
Place: MSAJCE  
Date: 28/04/2023

Yours Sincerely,

(Dr R.Someswaran)

Head of the Department  
DEPARTMENT OF CIVIL

Mohamed Sathak A.J.College of Engineering  
Siruseri IT Park, Chennai - 603 103



Contact: Ph: +91 9706572154 E-mail: civilhod@msajce.edu.in

Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Sagar (OMR)  
SIPCOT IT Highway Egattur,  
Chennai - 603 103

No:34, Rajiv Gandhi Road (OMR), IT Highway, Inside SIPCOT IT Park, Siruseri, Chennai - 603 103.

044-2747 0021, 2740 2970 044-2747 0022 principal@msajce.edu.in www.msajce.edu.in

**MSAJCE**

Siruseri IT Park, Chennai - 603 103  
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**Chennai Metro Rail Limited**  
(A Joint Venture of Govt. of India and Govt. of Tamil Nadu)

Letter No.170/CMRL/HR/IV/2023

Date: 29.04.2023

To  
Head of the Institution (ECE)  
Department of Civil  
Mohamed Sathak A.J. College of Engineering  
Siruseri IT Park,  
Chennai – 603 103.

Sir,

Sub: Industrial Visit in CMRL – Permission Granted.  
Ref: Mohamed Sathak A.J. College of Engineering Siruseri, Chennai- 600 035. Letter received dated 15<sup>th</sup> April 2023 – regarding Industrial visit.

\*\*\*\*\*

1. This is with reference to the letter cited above regarding requisition for Industrial Visit.
2. The Competent Authority has approved the Industrial Visit for students.

Sl. No	No of students	Date of Visit
1.	22	10.05.2023

3. The students shall report to Thiru. R. Srinivasan JGM (C&M) during the above mentioned Industrial Visit and the students list were attached.
4. The students shall sign an Indemnity Bond on stamp paper at the time of undergoing the Industrial Visit. A copy of the Blank Indemnity Bond is enclosed (Annexure – I) for your information and reference, which may please be duly completed in all respects and sent to this office before the commencement of the Industrial Visit. In case, the Indemnity Bond is not executed, then the students shall not be allowed to pursue the Industrial Visit in CMRL.

Copy To:  
JGM (C&M)

*(S. Rajaram)*  
AM (Admin)



**S. RAJARAM**  
Assistant Manager - Admin  
CHENNAI METRO RAIL LIMITED  
METROS, Anna Salai,  
Nandanam, Chennai - 600035

*(Mohamed Sathak A.J.)*

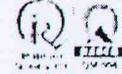
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

METROS, Anna Salai, Nandanam, Chennai - 600 035.

Email: [chennaiemtrorail@cmrl.in](mailto:chennaiemtrorail@cmrl.in) / Website: [www.chennaiemtrorail.org](http://www.chennaiemtrorail.org)

CIN : U60100TN2007SGC065596

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Department of Civil Engineering

Student Name List

Faculty Name: Mrs. P. Kavithra, AP/Civil

Mrs. V. Janaki, AP/Civil

S. No	Reg. No	Name	Gender
1	311820103001	Habeeb Musthafa M N	Male
2	311820103002	Mohamed Fahim S	Male
3	311820103003	Rajesh N	Male
4	311820103004	Yogaraj M	Male
5	311820103301	Adil Siraj	Male
6	311820103302	Afsar Hameed H	Male
7	311820103303	Ahamed Riswan.M	Male
8	311820103304	Isfaq Ahamed B	Male
9	311820103305	Jayaseelan	Male
10	311820103306	Logeshwaran P	Male
11	311820103307	Mohamed Jassim	Male
12	311820103308	Mohamed Yusuf Arshath A	Male
13	311820103309	Musthaq	Male
14	311820103310	Pradeep Kumar K	Male
15	311820103311	Priyadharshan	Male
16	311820103312	Raseed Ahamed M	Male
17	311820103314	Sudharsan A	Male
18	311821103001	Mohamed Faizal. A	Male
19	311821103003	Mohamed Haroon. M	Male
20	311821103004	Sandesh Kumar. K	Male
21	311821103005	Shanmugam. M	Male
22	311821103301	Mohamed Kaif.	Male

PRINCIPAL  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Nagar (SMR)  
Sector - IT Highway, Egattur,  
Chennai - 603103.

R. Somieswaran  
28/04/2023

(R. SOMIESWARAN)

Head of the Department

DEPARTMENT OF CIVIL

Mohamed Sathak A.J. College of Engineering  
Siruseri IT Park, Chennai - 603 103

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# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING



## DEPARTMENT OF CIVIL ENGINEERING

Industrial Visit to

**Prefabrication Yard (Chennai Metro Rail Project), Kolapakkam**

Organized by

Department of Civil Engineering

Visit Date: 10-May-2023

Between 10:00 am to 01:30 pm



Faculty co-coordinator

Mrs. P. Kavithra

Mrs. V. Janaki

**PRINCIPAL**  
Report prepared by  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Street, IT Highway Egattur,  
Mrs. P. Kavithra  
Chennai - 600100



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING



## ACKNOWLEDGEMENT

The students of 4<sup>th</sup> and 6<sup>th</sup> Semester Civil Department, were really thankful to our principal Dr. K.S. Srinivasan sir and Head of the Department Dr R. Someswaran sir respectively for their support to industrial visit to Prefabrication Yard(CMRL). We are also very thankful to Mr. J. Senthil, Chief Program Expert for arranging Site visit and Mr. Suman, Client for giving us an informative guidance and for sharing his experience and knowledge with students.

## A REPORT ON ONE DAY INDUSTRIAL VISIT

Place of visit: Kolapakkam

Date : 5<sup>th</sup> September 2023

A batch (23 Students) of 4<sup>th</sup> and 6<sup>th</sup> semester students of Department of Civil Engineering along with faculty members Mrs. P. Kavithra and Mrs. V. Janaki visited Prefabrication Yard(CMRL), Chennai.

### Purpose of visit:

Concepts of Prestressing along with Prefabrication process was learned through the experts in the yard. Girders for Overhead bridges for Chennai Metro Rail Project were made in the yard by the method of Post-tensioning and Pre-tensioning method. At First, they provided safety aids for all visitors once completing the video session. The overall process was explained in sequence: collection of materials, testing of materials, transporting, placing and curing. Additionally, steel cutting and gantry girder operation was explained.

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



# MOHAMED SATHAK

## A.J. COLLEGE OF ENGINEERING



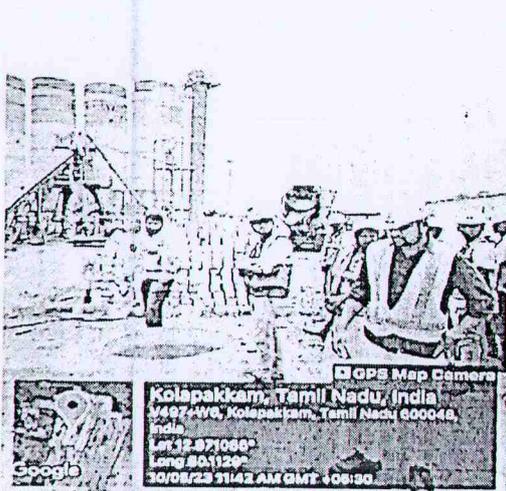
### PHOTO GALLERY



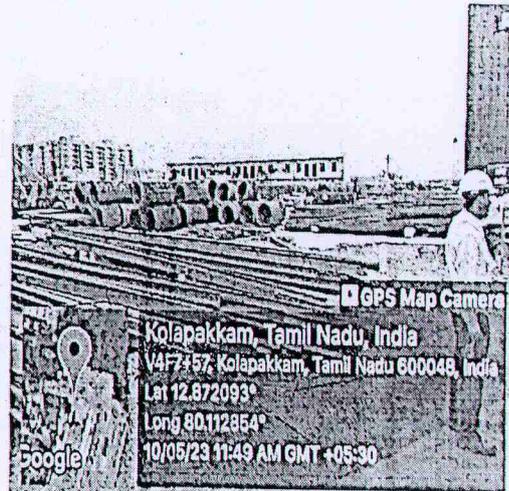
Video Session on Safety



Video Session on Prestressing



Materials storage



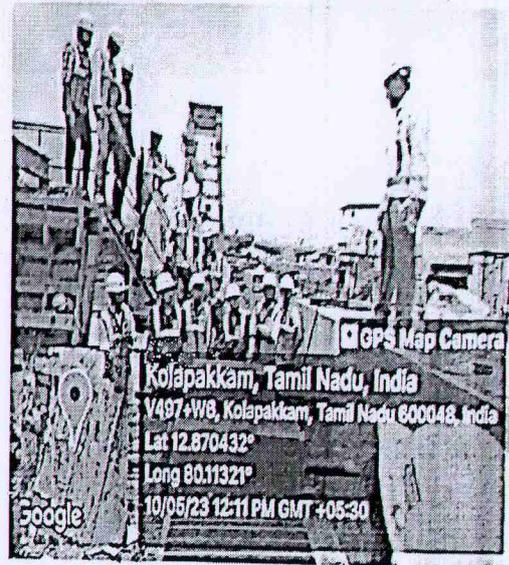
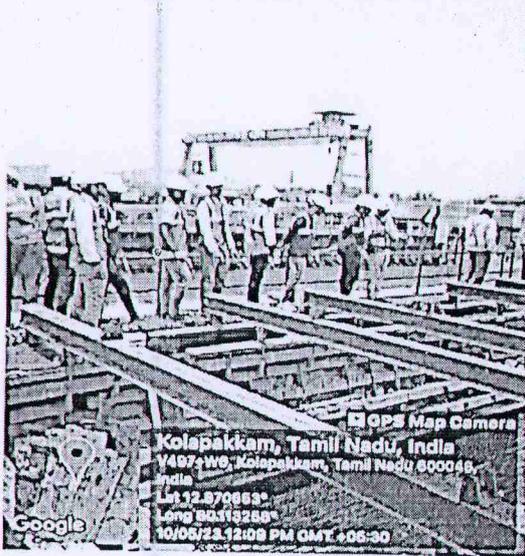
Steel yard

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



# MOHAMED SATHAK

## A.J. COLLEGE OF ENGINEERING



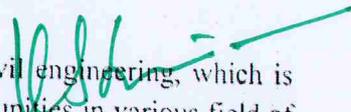
### Pre- Stress Concept Explanation



### Materials Testing Lab Visit

#### CONCLUSION:

Students learnt the Prestressing concept, advanced technique in civil engineering, which is the topic beyond the syllabus. Also gained knowledge in job opportunities in various field of Civil Engineering. The Site Visit was helpful in finding an idea of laying Metro Rail Line and Metro Station along the construction techniques.

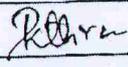
  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

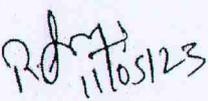
CONSENT FORM - INDUSTRIAL VISIT / TOUR

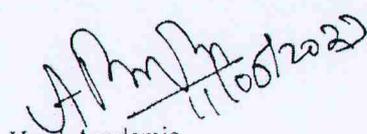
Undertaking Letter from Accompanying Staff/Faculty - Industrial Visits/Tour

- I/we will take care of the students participating in the tour
- I/We will ensure that the students will abide by rule and regulations of MSAJCE and also the Institution/Organization/Company/industry or the local authority of the place to which such tour is undertaken.
- I/We hereby state that all the parents/guardians of the students concerned are informed of their official trip well in advance and obtained their consent.
- I/We liable for disciplinary action if it is found that the safety of students is compromised in any manner during the tour.
- Students will not be taken or allowed to mountain areas, rivers, canals, beaches, water parks, reservoirs forest areas, etc and I/We are personally liable and answerable for any such untoward incident taking place during the tour. I/We shall ensure that if any activities are necessary in and around water bodies such as boating, swimming, rowing, and sailing, must be carried out under the supervision of a trainer/life guard only.

S. No	Name of the Faculty/Staff	Design. & Dept.	Mobile No	Alternative No	Signature
1.	Mrs. P. Kavithra	AP / Civil	9003777756	-	
2.	Mrs. V. Janaki	AP / Civil	7904242105	-	

✓  
Approved / Not Approved

  
Sign of the HoD with date

  
Head-Academic

Format No.: PLA 12

Rev.No.: 01

Rev.Date: 04.01.21

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



**MOHAMED SATHAK  
A.J. COLLEGE OF ENGINEERING**  
34, Rajiv Gandhi Salai (OMR), Siruseri IT Park, Chennai - 603 103.



From

Dr. R. Someswaran,  
Head of the Department,  
Department of Civil Engineering,  
Mohamed Sathak A.J College of Engineering,  
Chennai.

To

The Principal,  
Mohamed Sathak A.J College of Engineering,  
Chennai.

*Nominal charge need to  
collect from the student  
for Diesel Cost  
R. Someswaran  
020523*

Respected Sir,

**Sub: One Day Industrial Visit – II & III Year Civil Engg. - Permission Requested – Reg.**

We have planned to take the II & III Year Civil Engineering Students to Highway Research Station, Chennai-25 on 4<sup>th</sup> May 2023. In this regard, permission is kindly sought for Industrial visit and we need transport facility from our college as students would be highly benefited by this visit.

Number of Students : 22  
Accompanying Faculty : 1. Mrs.V.Janaki,Asst. Prof./ Civil  
2. Mrs.P. Kavithra,Asst. Prof./ Civil  
Date & Time of Departure : 04-05-2023 / 09.00 am

Thanking You

Date: 02/05/2023

Place: MSATCE

Yours Sincerely

*R. Someswaran*

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
SIPCOT - IT Highway Egattur,  
Chennai - 603103.

Dr. R. SOMESWARAN  
Head of the Department  
**DEPARTMENT OF CIVIL**

Mohamed Sathak A.J.College of Engineering  
Siruseri IT Park, Chennai - 603 103



**MOHAMED SATHAK  
A.J. COLLEGE OF ENGINEERING**  
34, Rajiv Gandhi Salai (OMR), Siruseri IT Park, Chennai - 603 103.



DEPARTMENT OF CIVIL ENGINEERING

02/05/2023

SUBMITTED TO THE PRINCIPAL

*Permitted*  
*mi*  
*02/05/23*

Sub: One Day Visit – II & III Year Civil Engg. - Permission Requested – Reg.

We have planned to take the Second & Third Year Civil Engineering Students to Highway Research Station, Chennai-25 on 4<sup>th</sup> May 2023. In this regard, permission is kindly sought as students would be highly benefited by this visit.

Number of Students : 22

Accompanying Faculty : 1.Mrs.V.Janaki Asst. Prof./ Civil  
2.Mrs.P.Kavithra Asst. Prof./ Civil

Date & Time of Departure : 04-05-2023 / 09.00 am

*V. Janaki*  
02/05/23  
FACULTY INCHARGE

[V. JANAKI]

*Permitted*

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

*R. Jay*  
02/05/23  
HOD / CIVIL

Head of the Department  
**DEPARTMENT OF CIVIL**  
Mohamed Sathak A.J.College of Engineering  
Siruseri IT Park, Chennai - 603 103

**HIGHWAYS DEPARTMENT  
HIGHWAYS RESEARCH STATION**

From  
**Er.R.Gothandaraman, M.E.,**  
Director,  
Highways Research Station,  
Sardar Patel Road,  
Guindy, Chennai - 25

To  
**The Head of the Department,**  
Department of Civil,  
Mohamed Sathak A.J.College of Engineering,  
34, Rajiv Gandhi Salai (OMR),  
Siruseri IT Park, Chennai - 103.

Lr. No.71/HRS/Traffic lab/2018/Dated: 21.04.2023

Sir,

**Sub:** HRS - Traffic lab - Mohamed Sathak A.J.College of Engineering - II & III -Year  
Civil Engineering Students - One day visit - Permission - Reg.

- Ref:** 1. The Head of the Department, Department of Civil, Mohamed Sathak A.J  
College of Engineering, 34, Rajiv Gandhi Salai (OMR), Siruseri IT Park,  
Chennai - 103. Letter No. Nil dated 29.03.2023.  
2. This office Lr. No. 71/HRS/Traffic lab/2018/Dated: 10.04.2023.  
3. The Head of the Department, Department of Civil, Mohamed Sathak A.J.  
College of Engineering, 34, Rajiv Gandhi Salai (OMR), Siruseri IT  
Park, Chennai - 103. Letter No. Nil dated 13.04.2023.

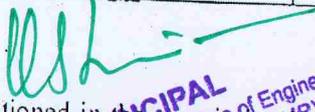
The Undersigned is pleased to grant permission for the Civil Engineering Students,  
Mohamed Sathak A.J.College of Engineering to undergo the one day industrial visit at  
Highways Research Station, Guindy, Chennai-25 subject to the remittance of training fee  
mentioned below.

The details of the training including fee structure with the conditions of HRS as  
follows:

S.No.	Type of Training	No. of Students	Year/ Branch	Date of visit	Training fee to be paid as per G.O (in Rs)	Remarks
1.	One day visit	20 Students along with 2 Faculty member.	II & III-year Civil Engineering Students	04/05/2023	Rs.4,000/- (Rupees Four Thousand only/-)	All labs

**Conditions:**

1. The Institute shall remit the training fee as mentioned in the permission letter issued by HRS.
2. The training fee shall be remitted before the date of one day visit.

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
34, Rajiv Gandhi Salai (OMR)  
Siruseri IT Highway Egattur,  
Chennai - 603103.

3. The training fee shall be drawn through Demand Draft in favour of "The Deputy Director – I, Highways Research Station, Sardar Patel Road, Guindy, Chennai-25" payable at Chennai.
4. Once the training fee is paid at HRS, the same will not be refunded to the Institute under any circumstances.
5. The students shall promptly report to the Training Co-Ordinator (i.e.) Assistant Director (Traffic) before the commencement of Training Program.
6. The students shall report to the Deputy Director of concerned lab as and when instructed during the course of training at HRS with proper dress code.
7. Change of date of training/one day visit is not entertained.
8. Working hours: Monday to Friday from 10:00 a.m. to 5:45p.m.
9. At NO point of time, during their training or at the completion of the same, the students shall be critical to the policies, principles, execution of works pertaining to Govt.
10. The students/institution will be held responsible for any breakage, damage, repair caused by them to any Material / Component / Equipments pertaining to HRS during the training period.
11. HRS does not provide any boarding & lodging facilities to the student trainees. It is the responsibility of the individuals to arrange for their accommodation & boarding during the Training period.
12. The students will solely be responsible for their belongings, during their Training at HRS. HRS is not responsible for any damage, loss or theft of their belongings.
13. Payment as mentioned in Cl.3 above, shall be remitted in the form of Demand Draft along with letter from Principal/HOD, at the O/o the Director, Highways Research Station, No. 76, Sardar Patel Road, Guindy, Chennai-25, in person during any working day from Monday to Friday (except Government Holidays) from 10.00am to 5.45 pm.

Copy to:

The Deputy Directors – I, II, III & IV,  
HRS, Guindy, Chennai-25

  
For Director,  
Highways Research Station,  
Chennai-25.

  
21/4/23



**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No 34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



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(अदाकर्ता शाखा / Drawee Branch)  
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अधिकृत हस्ताक्षरकर्ता  
Authorized Signatory (S.S. No.)



Please sign above

T21/MDDG

⑈075278⑈ 0000190001⑈

16

PRINCIPAL  
Mohamed Sahrak A.J. College of Engineering  
No.34, Ralliy Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

*Handwritten signature in green ink*



**MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING**  
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)



## DEPARTMENT OF CIVIL ENGINEERING

Industrial Visit to

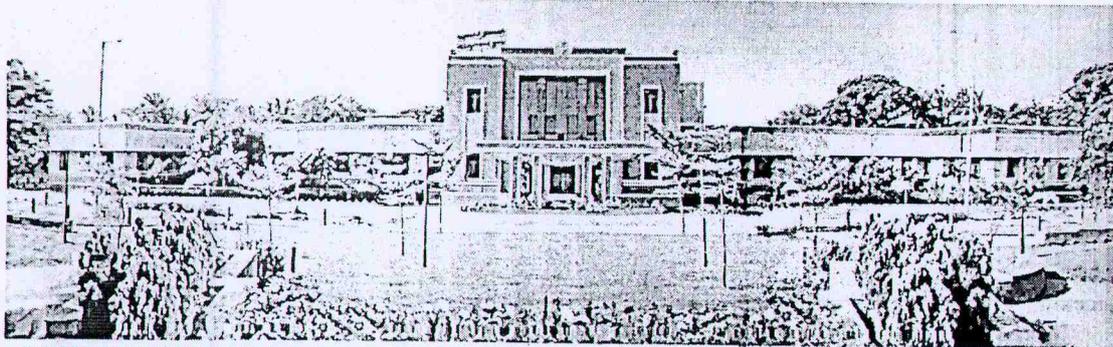
**Highway Research Station, Guindy, Chennai**

Organized by

Department of Civil Engineering

Visit Date: 04-May-2023

Between 10:00 am to 5:45 pm



MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING INDUSTRIAL VISIT ONEDAY PROGRAM - 04.05.2023



Faculty co-coordinator

Mrs V JANAKI  
Mrs P KAVITHRA

Report prepared by

Mrs V JANAKI

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



## A REPORT ON ONE DAY INDUSTRIAL VISIT

Place of visit: Highway Research Station, Guindy, Chennai.

Date : 04<sup>th</sup> May 2023

A batch (20 Students) of 2<sup>nd</sup> & 3<sup>rd</sup> Year students of Department of Civil Engineering along with faculty Mrs.V.Janaki AP/Civil, Mrs. KAVITHRA AP/Civil visited Highway Research Station, Guindy, Chennai

### PURPOSE OF VISIT:

To gather technical exposure of Highway Engineering, Highway Construction methods, Highway Materials, Material Testing method and other Engineering aspects of Highway Engineering Subject, this industrial visit has been organised.

Students have learnt about Test on Bitumen, Soil, Concrete and Admixtures used for making a concrete.

as an output of this industrial visit, we gained more knowledge on Highway Engineering aside from the theoretical aspect learned from the classrooms and laboratory.

From

10.00am to 11.30am – Students has Visited Bitumen lab

In this bitumen lab staff from bitumen section has explained about why the test on bitumen is important, and what are the test has been carried out for bitumen.

Specific Gravity of Bitumen

Ductility of Bitumen

Penetration of bitumen

Softening of Bitumen

Aggregate Crushing value

Flakiness and Elongation Index

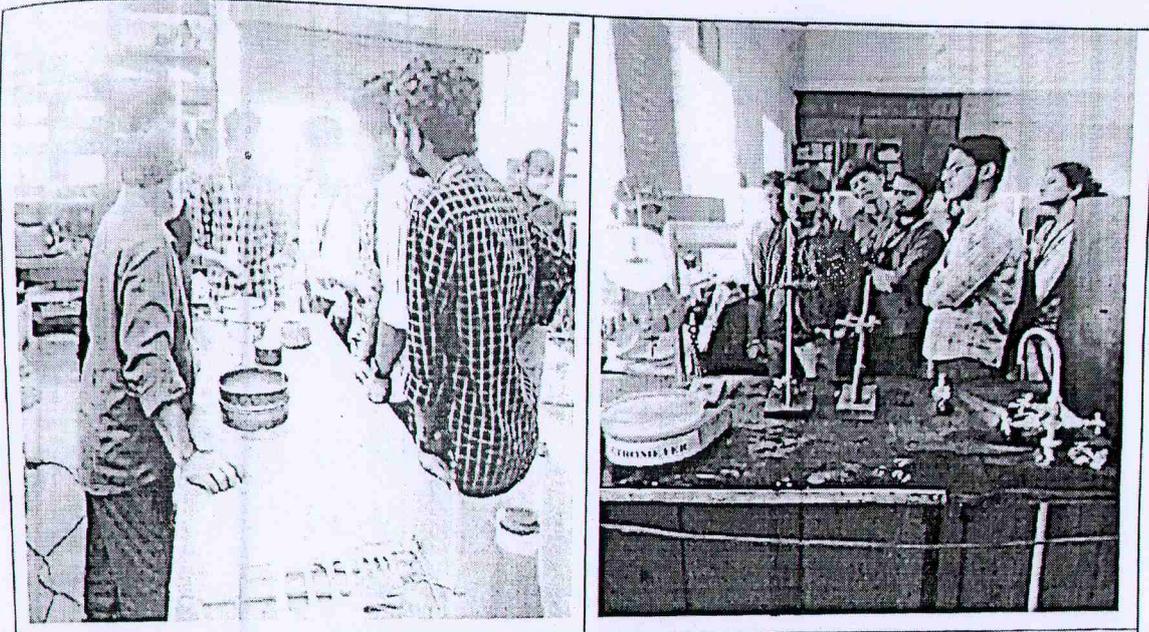
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Sipcot - IT Highway Egattur,  
Chennai - 603103.



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

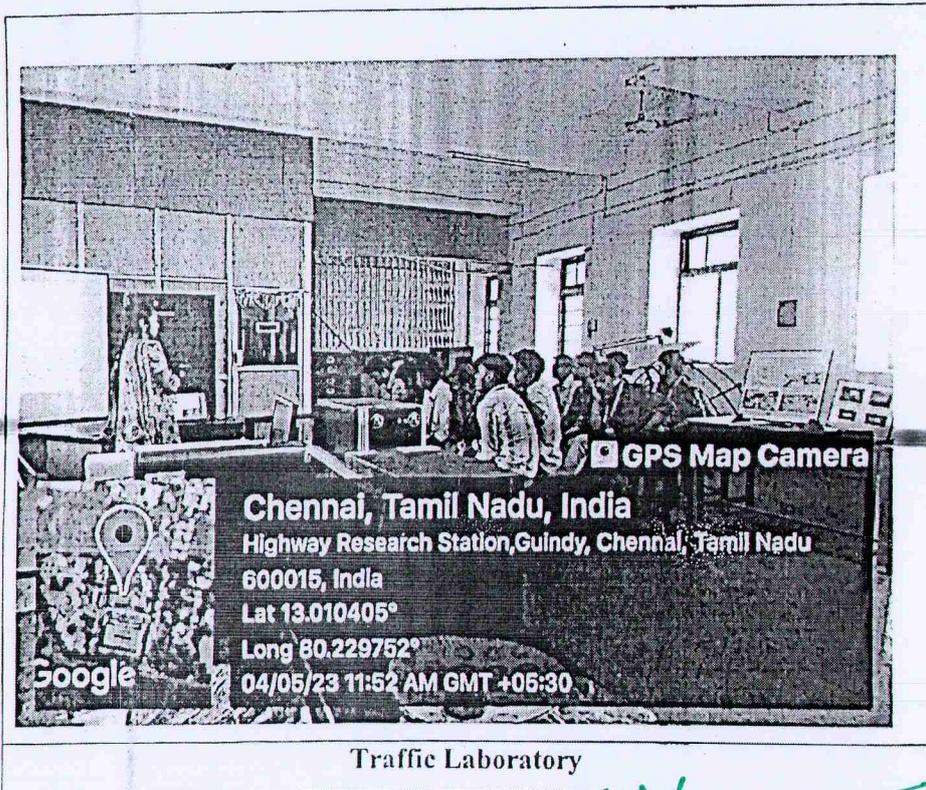
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Photos Taken at Bitumen Lab

## 11.45am to 1.15pm – Students has Visited Traffic Lab

In this Traffic lab she explained what are the rules and regulation has followed while travelling through Highway and Road signs.



Traffic Laboratory

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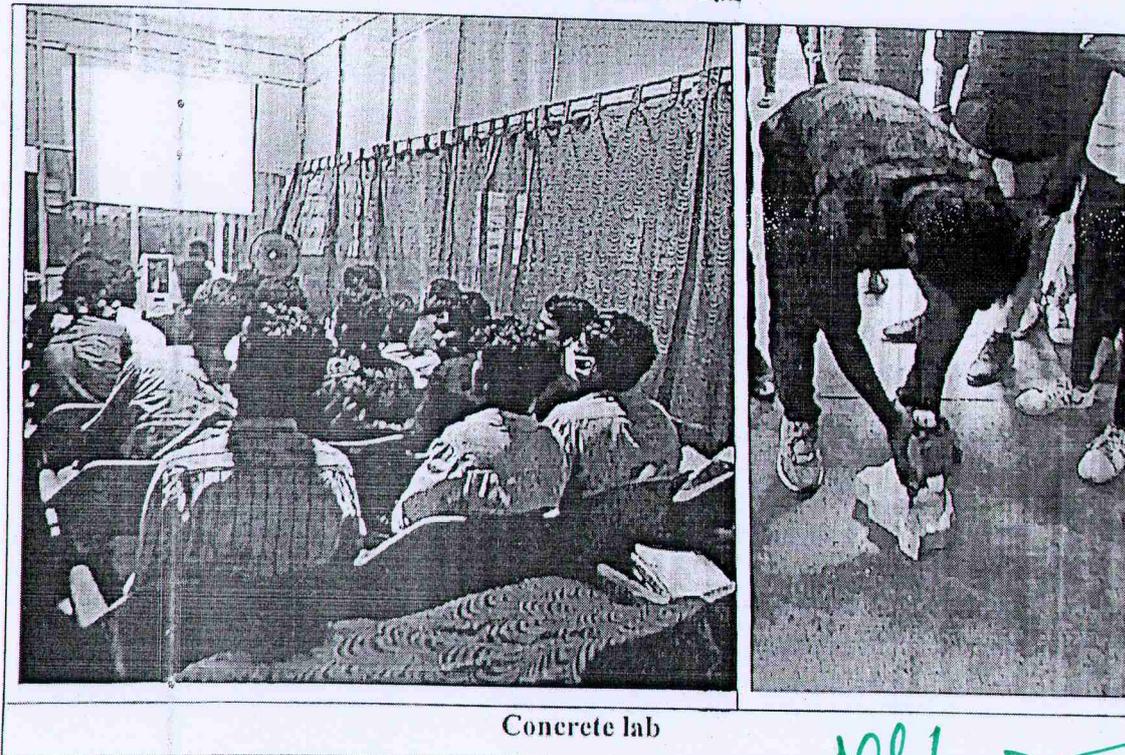


**2.00pm to 3.45pm - Students Has Visited Soil Lab**

In this soil lab they explained, how the soil plays important role in all civil engineering field and what are the test has been carried out for soil.



**4.00 pm to 5.45pm - Students has Visited Concrete Lab**



Concrete lab

*[Handwritten signature]*

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### CONCLUSION:

Thus by this industrial visit, students learnt How the Highway Engineering plays a main role in Transportation. Also student received knowledge about Important of test on Highway Material. By the interaction with staff working in Highway Research Station, students clarified some doubts in a smooth manner and gained input in the field of Highway Engineering.



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From

Dr. R. Someswaran,  
Head of the Department,  
Department of Civil Engineering,  
Mohamed Sathak A.J College of Engineering,  
Chennai.

To

The Principal,  
Mohamed Sathak A.J College of Engineering,  
Chennai.

Respected Sir,

Sub: One Day Industrial Visit – II & III Year Civil Engg. - Permission Requested – Reg.

We have planned to take the II & III Year Civil Engineering Students to Highway Research Station, Chennai-25 on 4<sup>th</sup> May 2023. In this regard, permission is kindly sought for Industrial visit and we need transport facility from our college as students would be highly benefited by this visit.

Number of Students : 22  
Accompanying Faculty : 1. Mrs.V.Janaki,Asst. Prof./ Civil  
2. Mrs.P. Kavithra,Asst. Prof./ Civil  
Date & Time of Departure : 04-05-2023 / 09.00 am

Thanking You

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Chennai - 603103.

Dr. R. SOMESWARAN  
Head of the Department  
DEPARTMENT OF CIVIL

Mohamed Sathak A.J College of Engineering  
SIPCOT IT Park Chennai - 603 103

Date: 02/05/2023

Place: M.S.A.J.C.E.



DEPARTMENT OF CIVIL ENGINEERING

02/05/2023

SUBMITTED TO THE PRINCIPAL

Sub: One Day Visit - II & III Year Civil Engg. - Permission Requested - Reg.

We have planned to take the Second & Third Year Civil Engineering Students to Highway Research Station, Chennai-25 on 4<sup>th</sup> May 2023. In this regard, permission is kindly sought as students would be highly benefited by this visit.

Number of Students : 22

Accompanying Faculty :  
1. Mrs. V. Janaki Asst. Prof./ Civil  
2. Mrs. P. Kavithra Asst. Prof./ Civil

Date & Time of Departure : 04-05-2023 / 09.00 am

**PRINCIPAL**

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Chennai - 603103.

**HOD / CIVIL**

Head of the Department

**DEPARTMENT OF CIVIL**

Mohamed Sathak A.J. College of Engineering  
Siruseri IT Park Chennai - 603 103

V. Janaki  
02/05/23  
FACULTY INCHARGE

[V. JANAKI]



### Slow Learner & Advanced Learner Policy

#### Slow learners:

**Slow learners** are identified through the performance in University examinations and mentored by the counselors. Intensive coaching is provided in Exam Preparation Classes (EPC) before the commencement of University examination, additional support material is provided as and when required, special coaching for communication skill and soft skills are also conducted. Learner's progress is discussed with their parents for academic improvement if necessary.

S.No	Identification Criteria	Actions taken
1	Students fail more than 2 subjects in end semester exams.	<ol style="list-style-type: none"><li>1. Counseling by senior faculty</li><li>2. Interaction with parents by mentors, if necessary.</li><li>3. Conduction of remedial classes.</li><li>4. Peer learning /Group Study/One to One Coaching</li><li>5. Simplified class notes.</li></ol>
2	Diploma/Vocational students with less basics of mathematics.	Conduction of remedial classes.

#### Advanced learners

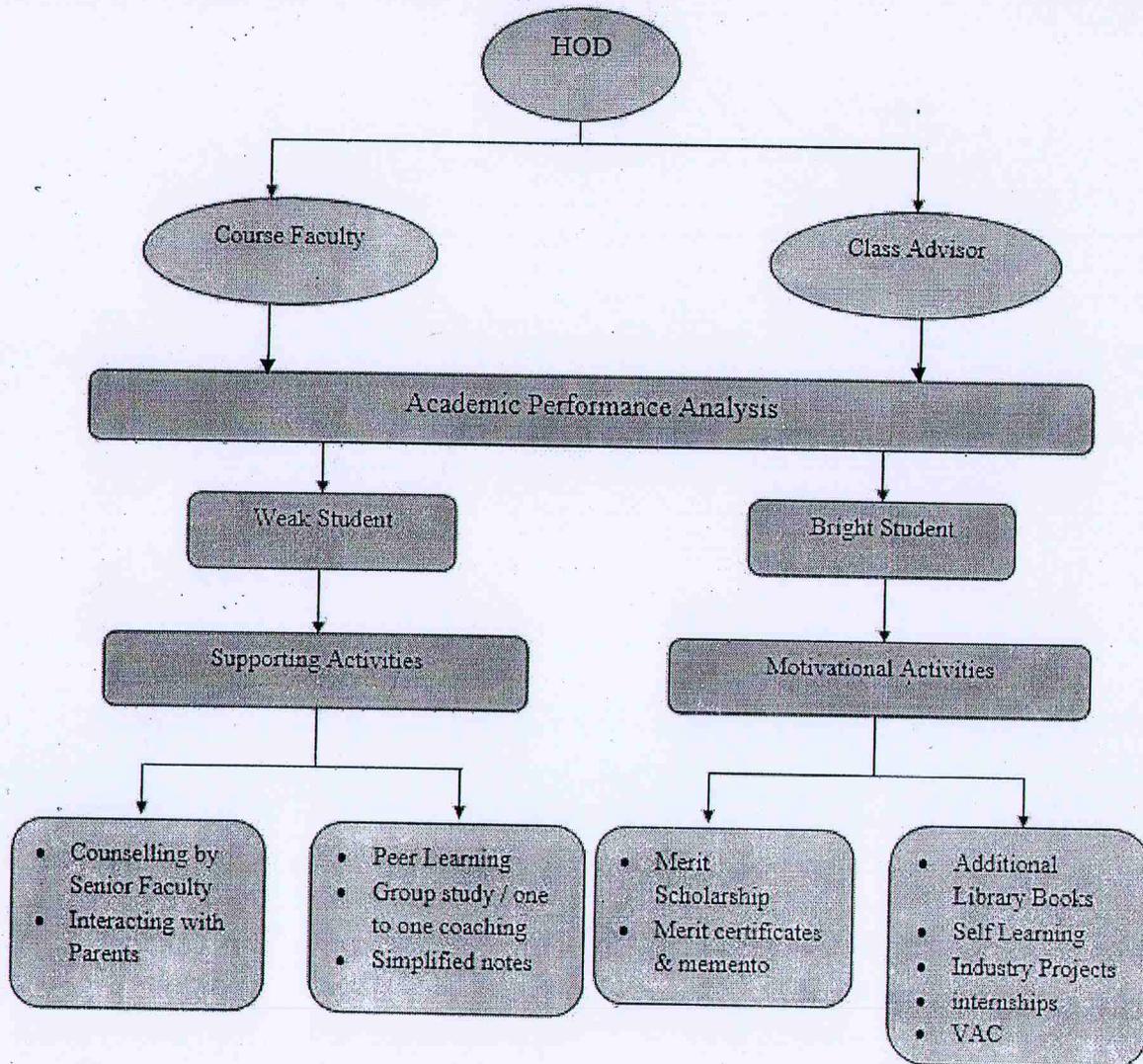
**Advanced learners** are identified based on their academic performance and involvement in various activities. They are motivated to learn cutting edge technologies apart from regular University curriculum in our technology centers, encouraged to participate in industry consultancy projects, competitions and Hackathon conducted by reputed organizations. Guidance for competitive examinations, orientation programmes for higher education and entrepreneur are arranged. They are encouraged to crystallize their ideas into a project which might earn them funding from the Institution / funding organization and also motivated to write papers to publish in reputed journal. Additional library card will be provided to access the central library reference books and journals.

S.No	Identification Criteria	Actions taken
1	Students who score 7.0 CGPA and above in their end semester exams.	<ol style="list-style-type: none"><li>1. Certificates with mementos.</li><li>2. Trust Scholarship/cash prizes.</li><li>3. Additional Library books.</li><li>4. Involving them in industrial projects.</li><li>5. Encouraging them to do self-learning.</li><li>6. Internships</li><li>7. Encouraging them to participate in competitions.</li><li>8. Training for Competitive exams.</li></ol>
2	Students securing ranks at University level.	Distribution of medals, certificates and cash prizes.

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**Process to Identify weak & bright students**



**Fig : Guidelines to identify weak & bright students and supporting activities**

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**Department of Mechanical Engineering**  
**Slow Learners**

SI No	REG.NUM	Stud. Name	No of arrears
1	311821114004	GOKULNATH.D	6
2	311821114007	JASWIN KUMAR B (H)	6
3	311821114011	MOHAMMED SAFREES (H)	5
4	311821114014	SANDEEP . S (H)	6
5	311821114015	SEYED AHAMED S .T (H)	6
6	311821114302	CHANDRU	4
7	311821114307	SYED MOHAMMED	4
8	311820114313	MOHAMED YASIR	4
9	311820114320	SRIRAM	3
10	311820114007	MOHAMED AJMAL	4
11	311820114011	MOHAMED ISMAIL	6
12	311820114307	MOHAMED ANAS	3

  
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## Mohamed Sathak AJ College of Engineering

### Academic Year 2022-23 Even sem - Slow learners Attendance Room No 329

Sl No	Student Name	Year	14/3/23	15/3/23	16/3/23	17/3/23	21/3/23	23/3/23	24/3/23	25/3/23	28/3/23
1	Gokulnath D	II	Gokul	Gokul	Gokul	Gokul	AB	Gokul	Gokul	Gokul	Gokul
2	Jaswinkumar	II	Jasw	Jasw	Jasw	Jasw	AB	Gokul	Gokul	Gokul	Gokul
3	Mohamed Safrees	II	M Saf	AB							
4	Sandeep	II	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Mot	Mot	AB
5	Syed Ahamed S T	II	Syed	Syed	Syed	Syed	Syed	Sandeep	Sandeep	AB	AB
6	Chandru	II	Chandru	Chandru	Chandru	Chandru	Syed	Syed	Syed	AD	Syed
7	Mohamed Yasir	III	Yasir	Yasir	Yasir	Yasir	Yasir	Chandru	Chandru	Chandru	Chandru
8	Sriram	III	AB	AB	Sri	Sri	Sri	Yasir	AB	Yasir	Yasir
9	Mohamed Ajmal	III	Ajmal	Ajmal	Ajmal	Ajmal	Sri	Sri	Sri	Sri	Sri
10	Mohamed Ismail	III	Ismail	Ismail	Ismail	Ismail	Mot	Mot	Mot	Mot	AD
11	Mohamed Anas	III	Anas								
Total Present			10	10	11	11	10	10	10	10	7
Total Absent			01	01	-	-	10	10	10	10	7
Faculty sign											

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[Handwritten Signature]

S. Ph  
 HOD / Mech. 28/3/23



**EXAM PREPARATION CLASS**  
**UNIT 3 THIN TORSION & SPRING**

**PART A**

1. Write down the expression for power transmitted by a shaft. April/May 2019

$$\text{Power } P = 2\pi NT/60 \text{ W}$$

$N \rightarrow$  (rpm) Speed

$T \rightarrow$  Torque (N-m)

2. Define Helical springs. April/May 2019

The helical spring, in which wire is wrapped in a coil that resembles a screw thread, is probably the most commonly used mechanical spring. It can be designed to carry, pull, or push loads. Twisted helical (torsion) springs are used in engine starters and hinges.

3. The shearing stress in a solid shaft is not to exceed  $40 \text{ N/mm}^2$  when the torque transmitted is  $20000 \text{ N-m}$ . Determine the minimum diameter of the shaft. Nov/Dec 2015

$$T = \frac{\pi}{16} \tau d^3$$

$$T = 20,000 \text{ N-m} \Rightarrow 20000 \times 10^3 \text{ N-mm}$$

$$20000 \times 10^3 = \frac{\pi}{16} \times 40 \times d^3$$

$$\Rightarrow d = 136.58 \text{ mm}$$

4. What is spring? What are the various types of springs? Nov/Dec 2015, 16, 17 & 2022  
Spring is a perfect elastic bodies which is used to absorb energy by taking strain in its form without permanent deformation and then release the same when it is required.

Types of springs

1. Laminated springs or Leaf springs
2. Helical coil springs
  - a. Closely coiled helical springs
  - b. Open coiled helical springs

5. Define Torsional Rigidity. Nov/Dec 2016 & 2022

Torsional rigidity or stiffness of material is defined as product of modulus of rigidity (C) and polar moment of inertia (J) of the shaft.

It is also defined as the torque required to producing a twist of one radian per unit length of the shaft.

$$\text{Torsional rigidity} = C \cdot J = (T \cdot L) / \theta$$

6. Write the expression for polar modulus for a solid shaft and for a Hollow shaft. Nov/Dec 2017

Polar modulus is defined as the ratio of polar moment of inertia to the radius of the shaft. It is also called as torsional section modulus.

Polar modulus = polar moment of inertia / radius of the shaft (J/R)

For solid shaft  $\pi/16 \cdot d^3$

For hollow shaft  $\pi(D^4 - d^4)/16 \cdot d^3$

7. What is called twisting moment? Nov/Dec 2018

When a pair of forces of equal magnitude but opposite direction acting on a body, it tends to twist the body. It is known as twisting moment or Torsional moment or simply as torque.

The Shaft is said to be in torsion, when equal and opposite torques are applied at two ends of the shaft. Torque is equal to the product of force applied and radius of the shaft. Unit: Nm

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A solid shaft is to transmit 300 kW @ 100 rpm if the stress is not to exceed  $80 \text{ N/mm}^2$ . Find the diameter of the shaft. If this shaft were to be replaced by hollow shaft of same material and length with an internal diameter of 0.6 times of the external diameter, what percentage saving in weight is possible.

- $P = 300 \text{ kW}$
- $N = 100 \text{ rpm}$
- $\tau = 80 \text{ N/mm}^2$
- $d = 0.6D$
- $d_1 \rightarrow$  Inner Dia of hollow shaft
- $D_1 \rightarrow$  Outer Dia of hollow shaft
- To find 1.  $D = ?$
- 2. % of saving in weight.

Av. 04 May

Sol:

W.K.T. Power  $P = \frac{2\pi NT}{60}$

$$300 \times 10^3 = \frac{2\pi \times 100 \times T}{60}$$

$$T = 28647 \times 10^3 \text{ N-m}$$

$$T = 28.647 \times 10^6 \text{ N-mm}$$

W.K.T.  $T = \frac{\pi}{16} \tau D^3$

$$T = \frac{\pi}{16} \times \tau \times D^3$$

$$28.647 \times 10^6 = \frac{\pi}{16} \times 80 \times D^3$$

$$D = 122.17 \text{ mm} \quad 114.86 \text{ mm}$$

Torque Transmitted by the Hollow shaft

$$T = \frac{\pi}{16} \times \tau \left[ \frac{D^4 - d^4}{D} \right]$$

$$T = \frac{\pi}{16} \times 80 \times \left[ \frac{D^4 - 0.6D^4}{D} \right]$$

$$T = \frac{\pi}{16} \times 80 \times D^3 (1 - 0.6^4)$$

$$T = 13.67 D_1^3$$

Torque Transmitted by the Solid shaft }  
Torque Transmitted by the Hollow shaft }

$$28.647 \times 10^6 = 13.67 D_1^3$$

∴ External Diameter of the Hollow shaft } = 127.96 mm

∴ Internal Diameter = 0.6 × D

$$d = 76.77 \text{ mm} \quad 72.1 \text{ mm}$$

% of Material saving

$$\frac{\text{Area of the Solid shaft} - \text{Area of Hollow shaft}}{\text{Area of solid shaft}} \times 100$$

$$= \frac{\frac{\pi}{4} D^2 - \frac{\pi}{4} (D^2 - d^2)}{\frac{\pi}{4} D^2} \times 100$$

$$= \frac{\frac{\pi}{4} (122.17)^2 - \frac{\pi}{4} (127.96^2 - 76.77^2)}{\frac{\pi}{4} (122.17)^2} \times 100$$

$$= \frac{823107 - 484842}{11722.46} \times 100$$

$$= 29.78\%$$

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Design a suitable diameter for a circular shaft to transmit 120 kW @ 1800 rpm. The shear stress in the shaft to exceed  $70 \text{ N/mm}^2$  and the max torque exceeds the mean by 40%. Calculate angle of twist in a length of 2m. Take  $C = 0.8 \times 10^5 \text{ N/mm}^2$ .

Given

$$P = 120 \text{ kW} = 120 \times 10^3 \text{ W}$$

$$N = 1800 \text{ rpm}$$

$$\tau = 70 \text{ N/mm}^2$$

$$T_{\text{max}} = 1.4 T_{\text{mean}}$$

$$L = 2 \text{ m}$$

$$C = 0.8 \times 10^5 \text{ N/mm}^2$$

To find

1. Diameter, D.
2. Angle of twist  $\theta$ .

Sol:

$$P = \frac{2\pi NT}{60}$$

$$120 \times 10^3 = \frac{2\pi \times 1800 \times T}{60}$$

$$T = 6366.19 \text{ N-m}$$

$$T = 6.36 \times 10^6 \text{ N-mm}$$

$$T_{\text{max}} = T_{\text{mean}} \times 1.4$$

$$T_{\text{max}} = 8.912 \times 10^6 \text{ N-mm}$$

$$T = \frac{\pi}{16} \times \tau \times D^3$$

$$8.912 \times 10^6 = \frac{\pi}{16} \times 70 \times D^3$$

$$D = 86.55 \text{ mm}$$

Using Torque equation

$$\frac{T}{J} = \frac{C\theta}{L}$$

$$J = \frac{\pi}{32} (D^4)$$

$$J = \frac{\pi}{32} (86.55)^4$$

$$J = 5.51 \times 10^6 \text{ mm}^4$$

$$\frac{T}{J} = \frac{C\theta}{L}$$

$$\theta = \frac{T \times L}{CJ} \Rightarrow \frac{8.912 \times 10^6 \times 2000}{0.8 \times 10^5 \times 5.51 \times 10^6}$$

$$\theta = 0.0404 \text{ rad}$$

to convert into degrees

$$\theta = 2.3^\circ$$

*Wsh*

Opposite

Design a suitable diameter for a Circular shaft to transmit 120 kW @ 1800 rpm. The shear stress in the shaft to exceed  $70 \text{ N/mm}^2$  and the max torque exceeds the mean by 40%. Calculate angle of twist in a length of 2m. Take  $C = 0.8 \times 10^5 \text{ N/mm}^2$ .

opposite

Given

$$P = 120 \text{ kW} = 120 \times 10^3 \text{ W}$$

$$N = 180 \text{ rpm}$$

$$\tau = 70 \text{ N/mm}^2$$

$$T_{\text{max}} = 1.4 T_{\text{mean}}$$

$$L = 2 \text{ m}$$

$$C = 0.8 \times 10^5 \text{ N/mm}^2$$

To find

1. Diameter. D.
2. Angle of twist  $\theta$ .

Sol:

$$P = \frac{2\pi NT}{60}$$

$$120 \times 10^3 = \frac{2\pi \times 180 \times T}{60}$$

$$T = 6366.19 \text{ N-m}$$

$$T = 6.36 \times 10^6 \text{ N-mm}$$

$$T_{\text{max}} = T_{\text{mean}} \times 1.4$$

$$T_{\text{max}} = 8.912 \times 10^6 \text{ N-mm}$$

$$T = \frac{\pi}{16} \tau D^3$$

$$8.912 \times 10^6 = \frac{\pi}{16} \times 70 \times D^3$$

$$D = 86.55 \text{ mm}$$

Using Torque equation

$$\frac{T}{J} = \frac{C\theta}{L}$$

$$J = \frac{\pi}{32} (D^4)$$

$$J = \frac{\pi}{32} (86.55)^4$$

$$J = 5.51 \times 10^6 \text{ mm}^4$$

$$\frac{T}{J} = \frac{C\theta}{L}$$

$$\Rightarrow \frac{8.912 \times 10^6 \times 2000}{0.8 \times 10^5 \times 5.51 \times 10^6} = \theta$$

$$\theta = 0.0404 \text{ rad}$$

to convert into degrees

$$\theta = 2.3^\circ$$

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① Spring is a perfect elastic bodies which is used to absorb falling strain form without permanent deformation. 14/3/23

- ii laminated Spring
- a) Closely Coiled
- ii open Coiled helical

② Primary function of Spring under load and to recover its original shape load released deflection energy and release the required

③ It is defined as Product of modulus of rigidity and Polar moment of inertia.

$$J \cdot G = (F \cdot L) / \theta$$
 This is called torsional rigidity

Spring Constant

④ It is defined as ratio of the mean diameter of the wire

$$k = \frac{8 F D^3}{\pi d^4 n}$$
 Spring Constant = mean dia<sup>3</sup> / d<sup>4</sup> n

⑤ It is defined as ratio of the ratio Polar moment of inertia to the radius of shaft. It is also called torsional section modulus

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Given data:

$$\text{Power } P = 300 \text{ kW} = 300 \times 10^3 \text{ W}$$

$$\text{Speed } (N) = 1000 \text{ rpm}$$

$$\text{Shear Stress} = 60 \text{ N/mm}^2$$

$$d = 0.6 D$$

$$d \text{ (D)} = 0.7 \text{ (D)} \text{ D}$$

$$D = 0.6 D$$

To find:

$d =$

$$\text{Power} = \frac{2\pi NT}{60} \text{ (W)}$$

$$300 \times 10^3 = \frac{2\pi \times 100 \times T}{60}$$

60

60

$$300 \times 10^3 \times 60 = T$$

$$2\pi \times 100$$

*Ush*  
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$$T = 28647.8 \text{ N-m}$$

$$T = 28647.8 \times 10^3 \text{ N-m}$$

$$T = \frac{\pi}{16} \tau d^3$$

$$T = \frac{\pi}{16} \times \tau \times D^3$$

$$T = \frac{\pi}{16} \tau d^3$$

$$28.647 \times 10^3 \times 16 = \frac{\pi \times 60 \times \tau \times D^3}{16}$$

$$T = \frac{\pi}{16} \tau \left( \frac{D^4 - d^4}{D} \right)$$

$$D = 15.70 \text{ mm}$$

$$28.647 \times 10^3 = \frac{\pi}{16} \times 60 \times \left( \frac{D^4 - 0.6D^4}{D} \right)$$

$$T = \frac{\pi}{16} \times 60 \times \left[ \frac{D^4 - 0.6D^4}{D} \right]$$

$$T = \frac{\pi}{16} \times 60 \times D^3 (1 - 0.6)$$

$$28.647 \times 10^3 = \frac{\pi}{16} \times 60 \times D^3$$

$$T = 10.254 D^3$$

$$\frac{28.647 \times 10^3 \times 16}{\pi \times 60} = D^3$$

$$\frac{28.647 \times 10^3 \times 16}{\pi \times 60} = D^3 \quad D = 134.472 \text{ mm}$$

$$28.647 \times 10^3 = 10.254 D^3$$

D =

External Diameter = 15.70

Hollow shaft  
Internal Diameter = 0.6 x D

$$0.6 \times 15.70$$

$$d = 9.42 \text{ mm}$$

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= Area of the Solid Shaft - Area of Hollow Shaft

Area of Solid Shaft  $\times 100$

$$= \frac{\pi}{4} D^2 - \frac{\pi}{4} (D^2 - d^2)$$

$$= \frac{\pi}{4} (15.20 \text{ mm})^2 - \frac{\pi}{4} (12.726^2 - 9.421^2)$$

$$\frac{\pi}{4} (15.20)^2$$

$$3.18632 - 4.82282$$

$$= \frac{11722.46}{3.18632}$$

$\times 100$

$$3.18632$$

$$= 1.672\%$$

  
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Hollows hear:

$$T = \frac{\pi}{16} \times \tau \left[ \frac{D^4 - d^4}{D} \right]$$

$$T = \frac{\pi}{16} \times 60 \left[ \frac{D^4 - 0.6^4}{D} \right]$$

$$T = \frac{\pi}{16} \times 60 \times D^3 (1 - 0.6^4)$$

$$T = \frac{\pi}{16} \tau \left[ \frac{D^4 - d^4}{D} \right]$$

$$28.647 \times 10^6 = \frac{\pi}{16} \times 60 \left( \frac{D^4 - 0.6^4}{D} \right)$$

$$28647 = \frac{28.647 \times 10^6 \times 1.6 \times 10^3}{\pi \times 60 \times (1 - 0.6^4)} = \frac{D^4}{D} (1 - 0.6^4)$$

$$D^3 = 2793695 \quad D = 2.669 \cdot 2$$

$$D = 140.8 \quad D = 1272$$

$d = 0.6D$   
 $d = 84.5$

Material Saving =  $\frac{\text{area of Solid Shaft} - \text{area of hollow shaft}}{\text{area of Solid Shaft}} \times 100$

area of Solid Shaft  $\times 100$

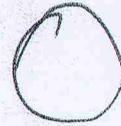
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$$\frac{\pi/4 p^2 - \pi/4 (D^2 - d^2)}{\pi/4 p^2}$$

$$\frac{\pi/4 (134.422) - \pi/4 (1272^2 - 26.32^2)}{\pi/4 (134.422)^2}$$

$$= 0.21 \times 100$$

$$= 21\%$$



Q1.  $\frac{E}{C} = ?$   $\int = ?$

$$n = 15$$

$$d = 16$$

$$p = 8 \text{ mm}$$

$$W = 1.4 \text{ kN}$$

$$C = 80 \times 10^9 \text{ Pa}$$

$$= 80 \times 10^9$$

$$10^6$$

$$\times 80 \times 10^9 \text{ N/mm}^2$$

*llh*  
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Now:

$$\int = \frac{64 W p^3}{\dots} \text{ mm}$$

$$\tau = \frac{16W\ell}{\pi d^3} \text{ N/mm}^2$$

$$J = \frac{64W\ell^3 n}{\pi C d^4} \text{ mm}^4$$

$$= \frac{16W\ell}{\pi d^3}$$

$$= \frac{64 \times 1.4 \times 10^3 \times 80^3 \times 15}{80 \times 10^3 \times 164}$$

$$= \frac{16 \times 1.4 \times 10^3 \times 10}{\pi \times 164}$$

$$= 131.22 \text{ mm}$$

$$= 139.26 \text{ N/mm}^2$$

Deflection =  $\sqrt{\quad} = 131.22 \text{ mm}$

Shear =  $\tau = 139.26 \text{ N/mm}^2$

Area of Solid Shaft =  $\frac{\pi}{4} d^2 = \frac{\pi}{4} \times 134.42 = 14191.1 \text{ mm}^2$

Area of Hollow Shaft =  $\frac{\pi}{4} (D^2 - d^2) = \frac{\pi}{4} (140.8^2 - 84.5^2)$

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Area of the Solid Shaft - Area of hollow Shaft

Area of Solid Shaft

$\times 100$

$$= \frac{\pi (134.472)^2 - \pi (140.8^2 - 84.5^2)}{\pi (134.472)^2} \times 100$$

$$\pi (134.472)^2$$

$\times 100$

$$= 4.3 \times 100\%$$

$$= 4.343\%$$

$$= \frac{(14191.1 - 9962.29)}{14191.1} \times 100$$

$\times 100$

$$14191.1$$

= Percentage of sewing material

$$= 29.7\%$$

12

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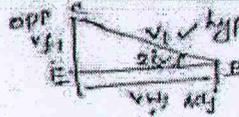




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Exact velocity nozzle  $V_e = \sqrt{2(h_1 - h_2) + V_1^2}$   
 $= \sqrt{2 \times 180 \times 10^3 + 30^2}$   
 $V_e = 600.75 \text{ m/s}$   
 $V_e = V_1 = 600.75 \text{ m/sec}$

From  $\Delta BCE$



$V_{W1} = V_1 \cos 25^\circ$   
 $= 600.75 \cos 25^\circ = 544.46$

$V_{f1} = V_1 \sin 25^\circ$   
 $= 600.75 \sin 25^\circ = 253.89$

$\frac{V_b}{V_{W1}} = 0.5$   
 $V_b = 0.5 V_{W1}$   
 $= 272.23 \text{ m/sec.}$

$\cos \theta = \frac{adj}{hyp}$

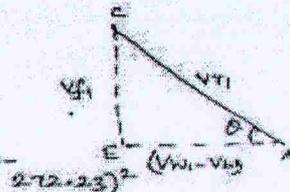
$\cos \theta = \frac{V_{W1}}{V_1}$   
 $V_{W1} = \cos \theta \cdot V_1$

$\sin \theta = \frac{opp}{hyp}$

$\sin \theta = \frac{V_{f1}}{V_1}$   
 $V_{f1} = \sin \theta \cdot V_1$

From  $\Delta ACE$

$V_{T1} = \sqrt{V_{f1}^2 + (V_{W1} - V_b)^2}$   
 $= \sqrt{(253.89)^2 + (544.46 - 272.23)^2}$



$V_{T1} = 372.25 \text{ m/sec.}$

$\tan \theta = \frac{V_{f1}}{V_{W1} - V_b} = \frac{253.89}{544.46 - 272.23}$

$\theta = 45^\circ$

But

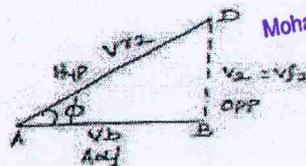
$V_{T2} = 0.9 V_{T1}$   
 $= 0.9 \times 372.25 = 335.03 \text{ m/sec.}$

$V_{T2} = 335.03 \text{ m/sec.}$

From  $\Delta ADB$   $\cos \phi$

$\cos \phi = \frac{adj}{hyp}$   
 $= \frac{AB}{AD} = \frac{V_b}{V_{T2}}$   
 $= \frac{272.23}{335.03}$

$\phi = 35^\circ 39'$



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$$V_2 = \sqrt{V_1^2 - V_b^2}$$

$$= \sqrt{385.03^2 - 272.03^2}$$

$$V_{f2} = V_2 = 195.28 \text{ m/sec}$$

Power developed

$$P = m (V_{w1} + V_{w2}) \times V_b$$

$$= 1 (544.46 + 0) \times 272.23$$

$$P = 148.21 \text{ kW}$$

Blade  $\eta$

$$= \frac{\eta (V_{w1} + V_{w2}) V_b}{\frac{1}{2} \times V_1^2}$$

$$= \frac{(544.46 + 0) 272.23}{\frac{1}{2} \times (600.75)^2}$$

$$= \frac{148218.3}{180.45 \times 10^3} = 82\%$$

Axial Thrust

$$F_y = m (V_{f1} - V_{f2})$$

$$= 1 (253.89 - 195.28)$$

2.

The velocity of steam leaving the nozzle of an impulse turbine is 1000 m/s and the nozzle angle is  $20^\circ$ . The blade velocity is 350 m/s and the blade velocity of co-efficient is 0.85. Assuming no losses due to shock at inlet calculate for a mass flow of 1.5 kg/sec and symmetrical blading (a) blade inlet angle (b) driving force on the wheel (c) axial thrust on the wheel (d) power developed by the turbine

Given data.

- $C_1 = 1000 \text{ m/sec}$
- $\alpha = 20^\circ$
- $C_b = 350 \text{ m/sec}$
- $K = 0.85$
- $M = 1.5 \text{ kg/sec}$

For symmetrical blading  $\theta = \phi$

Solution

From  $\Delta EBC$   $C_{w1} = C_1 \cos 20^\circ = 1000 \cos 20^\circ = 939.68 \text{ m/sec}$

$C_{f1} = C_1 \sin 20^\circ = 1000 \sin 20^\circ = 342.02 \text{ m/sec}$

$$\tan \theta = \frac{C_{f1}}{C_{w1} - C_b} = \frac{342.02}{939.68 - 350}$$

$$\theta = 35.71^\circ$$

From  $\Delta EAC$

$$C_{T1} = \sqrt{C_{f1}^2 + (C_{w1} - C_b)^2}$$

$$= \sqrt{(342.02)^2 + (939.68 - 350)^2}$$

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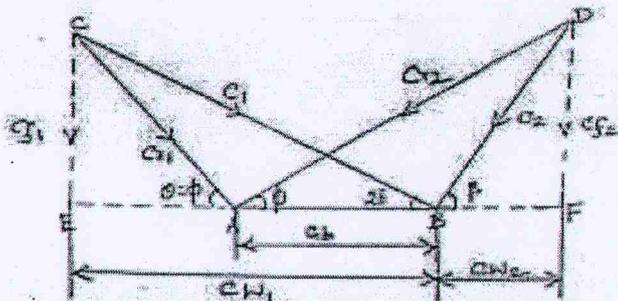
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$$= 681.7 \text{ m/sec}$$

But  $K = \frac{C_{Y2}}{C_{Y1}} = 0.85$

$$\therefore C_{Y2} = 0.85 C_{Y1}$$

$$= 0.85 \times 681.7 = 579.45 \text{ m/sec}$$



For symmetrical blading

$$\alpha = \phi = 30^\circ$$

From  $\Delta DAF$   $C_{Y2} = C_2 \sin \phi = 579.45 \sin 30^\circ$   
 $= 290.79 \text{ m/sec}$

ii)

$$C_b + C_{W2} = C_2 \cos \phi$$

$$350 + C_{W2} = 579.45 \cos 30^\circ$$

$$\therefore C_{W2} = 151.76 \text{ m/sec}$$

From  $\Delta BDF$   $C_2 = \sqrt{C_{Y2}^2 + C_{W2}^2} = \sqrt{(290.79)^2 + (151.76)^2}$   
 $= 325 \text{ m/sec}$

Driving force

$$F_x = m(C_{W1} + C_{W2})$$

$$= 1.5(939.69 + 151.76)$$

$$= 1637.18 \text{ N}$$

Axial Thrust

$$F_y = m(C_{Y1} - C_{Y2})$$

$$= 1.5(3 + 2.02 - 290.79)$$

$$= 76.85 \text{ N}$$

Power developed

$$P = m C_b (C_{W1} + C_{W2})$$

$$= m C_b (C_{W1} + C_{W2}) = F_x \times C_b$$

$$= 1637.18 \times 350 = 573.01 \text{ kW}$$

**$P = 573.01 \text{ kW}$**

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Sandeep  
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Take flow in a single stage turbine. The velocity of the steam at the exit of the turbine is very high. The speed of the rotor is too high. Compaunding is about 10 to 12%.

4.

The blade efficiency is defined as the ratio between work done on the blade and energy supplied to the blade.

$$\eta_b = \frac{\text{work done on the blade}}{\text{energy supplied to the blade}}$$
$$= 2u (v_{w1} - v_{w2}) / v_1^2$$

5. It is defined as the ratio of isentropic heat drop in moving blade to isentropic heat drop in entire stage of the reaction turbine.

$$R = \frac{\text{enthalpy drop in moving blade}}{\text{enthalpy drop in entire stage}}$$
$$= \frac{h_2 - h_3}{h_1 - h_3}$$

Part B.

Q. Given Data.

$$\rho = 200 \text{ kg/m}^3$$

$$\eta = 90\%$$

blade angle =  $\alpha$

$v_b$  = blade speed

$$\frac{v_b}{v_w} = 0.5$$

blade coefficient  $\frac{v_{w2}}{v_{w1}} = 0.9$

$$v_1 = 30 \text{ m/s}$$

$$v_2 = v_{f2}$$

$$v_{w2} = 0$$

$$\beta = 90^\circ$$

Formulae

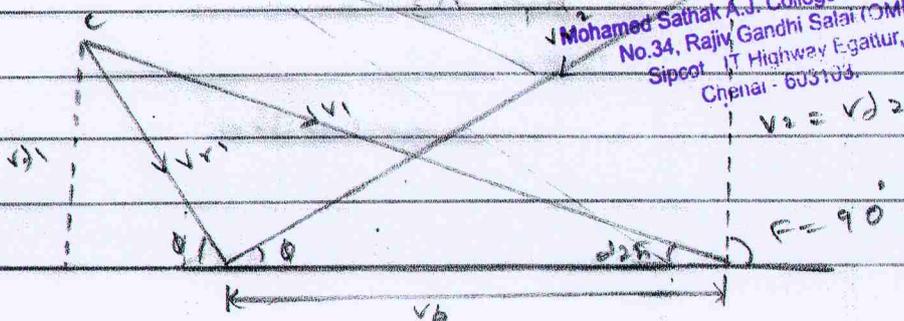
$$P = m (v_{w1} + v_{w2}) \times v_b$$

$$Q = m \frac{(v_{w1} + v_{w2}) \times v_b}{2 v^2}$$

$$\frac{m \times 1}{2 v^2}$$

$$F_y = m (v_{f1} - v_{f2})$$

Velocity Triangle



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$$v_2 = v_{f2}$$

$$F = 90^\circ$$

Actual enthalpy drop  $h_i - h_o = (h_i - h_o) \times \eta_h$

$$= 200 \times 0.9$$

$$= 180 \text{ kJ/kg}$$

$$\therefore \text{Actual enthalpy drop} = 180 \times 10^3 \text{ kJ/kg}$$

exit velocity  $v_e = \sqrt{2(h_i - h_o) + v_i^2}$

$$= \sqrt{2 \times 180 \times 10^3 + 30^2}$$

$$= 600.75 \text{ m/s}$$

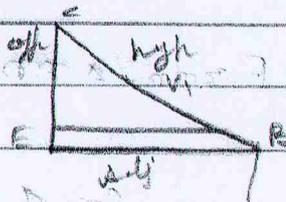
$$v_e = v_i = 600.75 \text{ m/s}$$

From  $\triangle BCE$

$$v_{w1} = v_i \cos 25^\circ$$

$$= 600.75 \cos 25^\circ$$

$$= 544.46$$



$$\cos \theta = \frac{\text{wh}}{\text{hyp.}}$$

$$\cos \theta = \frac{v_{w1}}{v_i}$$

$$v_{a1} = v_i \sin 25^\circ$$

$$= 600.75 \sin 25^\circ$$

$$\frac{v_b}{v_{w1}} = 0.5$$

$$v_b = 0.5 v_{w1}$$

$$v_b = 0.5 v_{w1}$$

$$= 272.23 \text{ m/s}$$

$$v_{w1} = \cos \theta \cdot v_i$$

From  $\triangle ACE$

$$v_{e1} = \sqrt{v_{a1}^2 + (v_{w1} - v_b)^2}$$

$$= \sqrt{(253.89)^2 + (544.46 - 272.23)^2}$$

$$v_{e1} = 372.25 \text{ m/s}$$

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$$\tan \theta = \frac{v_f}{v_{\infty}}$$

$$v_{\infty} = v_b$$

$$= \frac{253.81}{544.46 \times 272.23}$$

$$= 272.23$$

$$\theta = 13^\circ$$

But

$$v_{r2} = 0.9 v_{r1}$$

$$= 0.9 \times 372.25$$

$$v_{r2} = 335.93 \text{ m/sec}$$

From  $\triangle ADB$   $\cos \phi$

$$\cos \phi = \frac{\text{adj}}{\text{hyp}}$$

$\text{adj} = AB$

$$= \frac{AB}{AD} = \frac{v_b}{v_{r2}}$$

$$= \frac{272.23}{372.25}$$

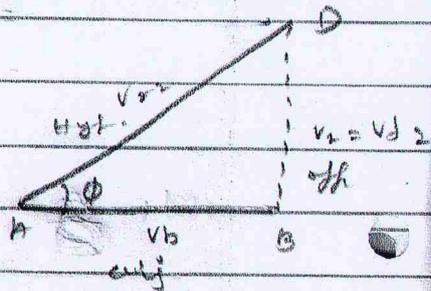
$$= 0.731$$

$$\phi = 35^\circ$$

$$v_2 = \sqrt{v_{r2}^2 - v_b^2}$$

$$= \sqrt{335.93^2 - 272.23^2}$$

$$v_2 = v_f = 195.28 \text{ m/sec}$$



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Power developed  $P = m(v_{w1} + v_{w2}) \times v_b$

$= (544.46 + 0) \times 272.23$

$P = 148.21 \text{ kW}$

Blade  $\eta = \frac{m(v_{w1} + v_{w2}) v_b}{\frac{1}{2} m v_1^2}$

$= \frac{(544.46 + 0) 272.23}{\frac{1}{2} \times (600.75)^2}$

$= \frac{148218.3}{180.45 \times 10^3}$

$= 0.822$

$= 82.2\%$

~~$= 82.2\%$~~

②

Given data

$m = 300 \text{ kg/min}$   $T = 5 \text{ kg/sec}$

$P = 2 \text{ bar}$

$\pi = 0.03$

$\alpha = \phi = 20^\circ$

$P = 3.68 \text{ kW} = 3680 \text{ W}$

$N = 360 \text{ rpm}$

Tip leakage = 5%

$\frac{c_{1r}}{c_b} = \frac{c_{2r}}{c_b} = 0.8$

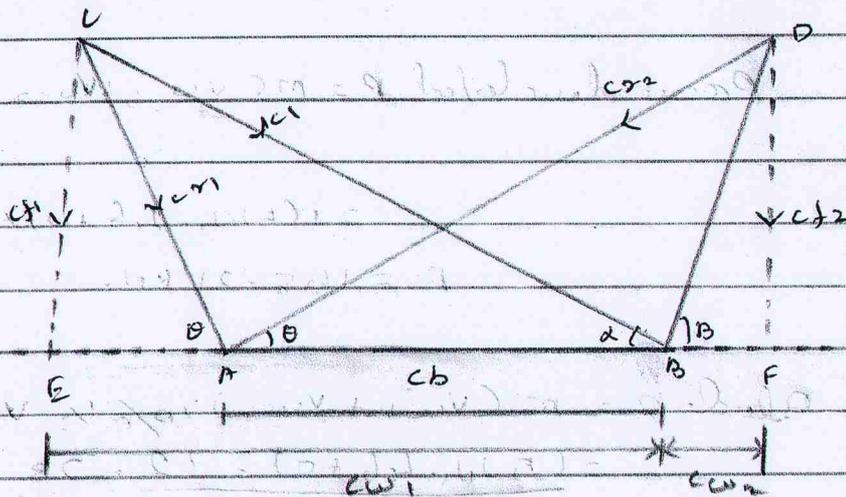
$c_b$

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From the velocity diagram by construction

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From  $\Delta DAF$

~~$$\tan \theta = \frac{c}{AF}$$~~

$$\tan \theta = \frac{c/2}{AF} = \frac{c/2}{cb + cw_2}$$

$$c/2 + cw_2 = \frac{c/2}{\tan \theta} = \frac{c/2}{\tan 2\theta}$$

$$= 2.75 c/2$$

$$cb + cw_2 = 2.75 c/2$$

$$0.43c_1 + cw_2 = 2.75 \times 0.3 + c_1$$

$$0.43c_1 + cw_2 = 0.935c_1$$

$$cw_2 = 0.505c_1$$

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Power developed  $P = m(cw_1 + cw_2) + 3c_1$

$$3680 = (0.43c_1 + 0.505c_1) \times 1000 + 3c_1$$

$$c_1 = 94.42 \text{ m/sec}$$

$$cb = 0.43c_1$$

$$= 0.43 \times 94.42$$

$$= 40.8 \text{ m/sec}$$

$c_1 = 94.42$

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$$= 0.8 \times 14.8$$

$$= 11.84 \text{ m/sec.}$$

$$C_b = \frac{\pi D_m}{60}$$

$$14.8 = \frac{\pi \times D_m \times 360}{60}$$

$$D_m = 0.79$$

$$m = 5 - (5 \times 0.05)$$

$$= 4.75 \text{ m/sec.}$$

From steam table  $p_1 = 2 \text{ bar}$

$$v_g = v_g$$

$$= 0.8854 \text{ m}^3/\text{kg}$$

mass of steam flow/sec.

$$m = \frac{\pi D_m^2}{4} \times \frac{h}{2v}$$

$$4.75 = \frac{\pi \times 0.79^2 \times h \times 11.84}{0.8 \times 0.8854}$$

Height of the blade  $h = 0.1125 \text{ m.}$

$$h = 112.5 \text{ mm.}$$

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③

Data Given

$c_1 = 630 \text{ m/sec}$

$c_b = 125 \text{ m/sec}$

$\alpha_1 = 16^\circ$

$\phi_1 = 18'$

$\alpha_2 = 22^\circ$

$\phi_2 = 36'$

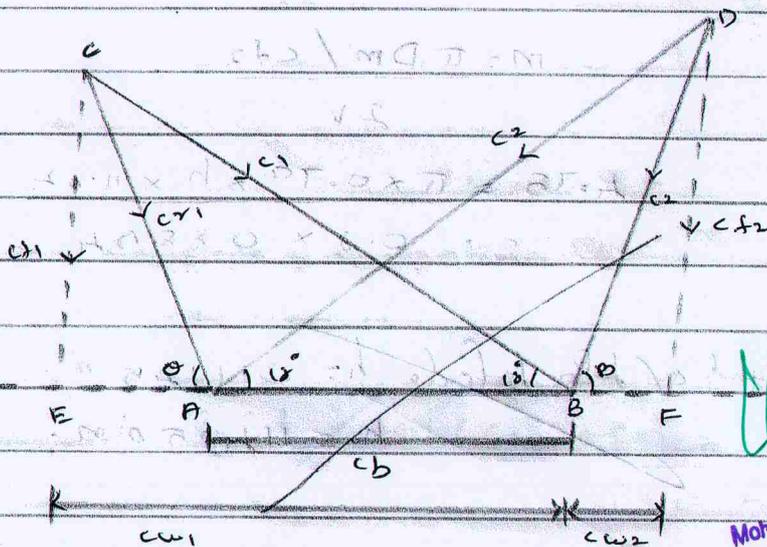
$m = 2.6 \text{ kg/sect}$

$\frac{c_{r2}}{c_{r1}} = \frac{c_3}{c_2}$

$c_{r1} \text{ and } c_2$

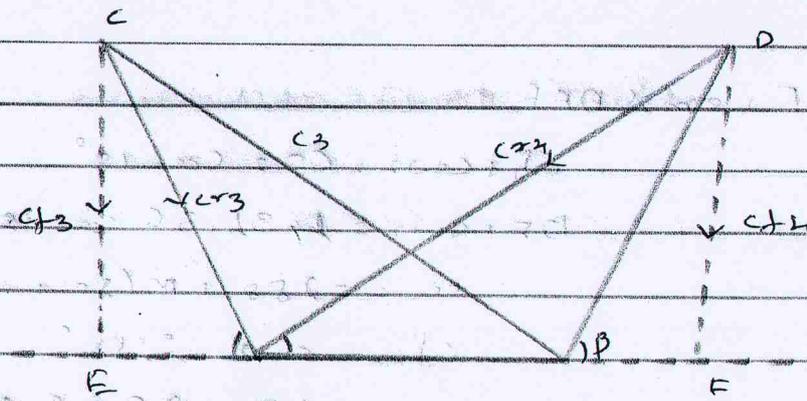
$= \frac{c_{r1}}{c_{r2}} = 0.35$

$c_{r3}$



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velocity diagram for first stage



From  $\triangle EBC$

$$\begin{aligned}
 C_{w1} &= C_1 \cos 16^\circ \\
 &= 630 \cos 16 \\
 &= 605.6 \text{ m/sec.}
 \end{aligned}$$

$$\begin{aligned}
 C_{d1} &= C_1 \sin 16 \\
 &= 630 \sin 16 \\
 &= 173.65 \text{ m/sec.}
 \end{aligned}$$

From  $\triangle ACE$

$$\begin{aligned}
 C_{r1} &= \sqrt{C_{d1}^2 + (C_{w1} - C_b)^2} \\
 &= \sqrt{173.65^2 + (605 - 25)^2} \\
 &= 511.01 \text{ m/sec.}
 \end{aligned}$$

But  $\frac{C_{r2}}{C_{r1}} = 0.85$

$$C_{r2} = 0.85 \times 511.01$$

$$= 434.36 \text{ m/sec.}$$

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From  $\Delta OAF$

$$c_b + c_w \sin 18^\circ = c_2 \cos 18^\circ$$

$$125 + c_w \sin 18^\circ = 34.36 \cos 18^\circ$$

$$c_w \sin 18^\circ = 258.1 \text{ m/sec}$$

$$c_b = c_2 \sin 18^\circ$$

$$= 34.36 \sin 18^\circ$$

$$= 10.7 \text{ m/sec}$$

From  $\Delta OBE$

$$c_2 = \sqrt{c_b^2 + c_w^2}$$

$$= \sqrt{10.7^2 + 258.1^2}$$

$$= 260.16 \text{ m/sec}$$

But  $\frac{c_3}{c_2} = 0.85$

$$c_3 = 0.85 \times 260.16$$

$$= 220.14 \text{ m/sec}$$

From  $\Delta HJK$

$$c_w \sin 22^\circ = c_3 \cos 22^\circ$$

$$= 220.14 \cos 22^\circ$$

$$= 203.49 \text{ m/sec}$$

$$c_b = c_3$$

$$\sin 22^\circ = 220.14 \sin 22^\circ$$

$$= 101.2 \text{ m/sec}$$

$$c_2 = \sqrt{c_b^2 + (c_w - c_b)^2}$$

  
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Axial Load

$$F_u = \left[ (C_{t1} + C_{t2})_{\text{Stage 1}} + (C_{t3} - C_{t4})_{\text{Stage 2}} \right]$$

$$= 2.6 \left[ (173.68 - 134.23) + (101.2 - 80.54) \right]$$

$$= 156.21 \text{ N.}$$

Power developed.

$$P = m \left[ (C_{w1} + C_{w2})_{\text{Stage 1}} + (C_{w3} + C_{w4})_{\text{Stage 2}} \right]$$

$$= 2938.13 \times 125$$

$$= 367266.25 \text{ N}$$

$$= 367.27 \text{ kW.}$$

Total energy supplied

$$E = \left( \text{Energy supplied} \right)_{\text{Stage 1}} + \left( \text{Energy supplied} \right)_{\text{Stage 2}}$$

$$= m \left[ \frac{1}{2} C_1^2 + \frac{1}{2} C_3^2 \right]$$

$$= 2.6 \left[ \frac{1}{2} 630^2 + \frac{1}{2} 270.16^2 \right]$$

$$= 610.85 \text{ kW.}$$

Blading efficiency

$$\eta_b = \frac{\text{Power developed}}{\text{Energy supplied}}$$

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DEPARTMENT OF MECHANICAL ENGINEERING

ACADEMIC YEAR - 2022-2023 ODD SEM - SLOW LEARNERS ATTENDANCE - ROOM NO - 329

DAYSCHOLAR STUDENTS STUDY HOUR		YEAR	DATE									
S NO	STUDENTS NAME		7.11.22	8.11.22	9.11.22	10.11.22	14.11.22	15.11.22	16.11.22	17.11.22	18.11.22	19.11.22
1	GOKULNATH.D	II	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul
2	HARI. M	II	Hari	Hari	Hari	Hari	Hari	Hari	Hari	Hari	Hari	A
3	JASWIN KUMAR B	II	JasB	JasB	JasB	JasB	JasB	JasB	JasB	JasB	JasB	JasB
4	MOHAMMED SAFREES	II	Msal	Msal	Msal	Msal	Msal	a	a	Msal	Msal	Msal
5	SANDEEP . S	II	Sandeep	S	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep
6	SEYED AHAMED S .T	II	seyed	seyed	seyed	seyed	seyed	seyed	seyed	seyed	seyed	seyed
7	CHANDRU	II	A	a	cha	cha	cha	cha	cha	cha	cha	cha
8	MOHAMED SHUHAIBU	III	nahid	nahid	nahid	nahid	nahid	a	a	nahid	nahid	nahid
9	SRIRAM.N	III	srini	srini	a	srini						
10	KIFAN SHAKLINE.H	III	Kifan	Kifan	Kifan	Kifan	Kifan	Kifan	Kifan	Kifan	Kifan	Kifan
11	K MANIKANDAN	III	Mani	Mani	Mani	Mani	Mani	Mani	Mani	Mani	Mani	Mani
12	MOHAMED ANSAR ALI .N	III	A	A	A	A	A	A	A	A	A	A
13	MOHAMED YAZIR	III	Yas	a	a	A	Yas	Yas	Yas	Yas	Yas	Yas
14	ARUN.T	III	Arun	Arun	Arun	Arun	Arun	Arun	Arun	Arun	Arun	Arun
15	MOHAMED AJMAL A. R	III	Ajmal	Ajmal	Ajmal	Ajmal	Ajmal	Ajmal	Ajmal	Ajmal	Ajmal	Ajmal
16	MOHAMED ISMAIL.A	III	ismail	ismail	ismail	ismail	ismail	ismail	ismail	ismail	ismail	ismail
17	MOHAMED ANAS.M	III	Anas	Anas	Anas	Anas	Anas	Anas	Anas	A	A	Anas
18	NAJUBUDEEN K	IV	A	A	a	A	A	A	A	A	A	A
19	SARATHKUMAR.N	IV	Sarath	Sarath	Sarath	Sarath	Sarath	Sarath	Sarath	Sarath	Sarath	Sarath
20	RAMKUMAR.C	IV	Ram	Ram	Ram	Ram	Ram	Ram	Ram	Ram	Ram	Ram
21	SANJAY KUMAR.C	IV	Sanjay	Sanjay	Sanjay	Sanjay	Sanjay	Sanjay	Sanjay	Sanjay	Sanjay	Sanjay
22	UMAR MUBARAK M	IV	A	Umar	Umar	Umar	Umar	a	a	Umar	A	Umar
23	JAHEETH SALMAN. B	IV	Jah	Jah	Jah	Jah	Jah	Jah	Jah	Jah	A	Jah
24	LAXSHAN M	IV	Lax	Lax	Lax	Lax	Lax	Lax	Lax	Lax	Lax	Lax
25	MOHAMED ARSATH M	IV	arsath	arsath	arsath	arsath	arsath	arsath	arsath	arsath	arsath	arsath
Total Present			21	20	22	23	25	22	22	23	21	22
Total Absent			4	5	3	2	Nil	03	3	02	4	02
Faculty sign												

Principal  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (Old)  
Sriperumbadi - IT Highway, Erode - 635109

MOHAMED SATHAK A J COLLEGE OF ENGINEERING

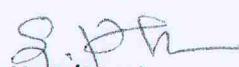
DEPARTMENT OF MECHANICAL ENGINEERING

ACADEMIC YEAR - 2022-2023 ODD SEM - SLOW LEARNERS ATTENDANCE - ROOM NO - 329

S NO	STUDENTS NAME	YEAR	DATE											
			21.11.22	22/11	23/11	24/11	25/11	28/11	29/11	30/11	1/12	2/12		
1	GOKULNATH.D	II	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul	Gokul
2	HARI. M	II	hari	hari	hari	hari	hari	hari	hari	hari	hari	hari	hari	hari
3	JASWIN KUMAR B	II	Jaswin	Jaswin	A	Jaswin								
4	MOHAMMED SAFREES	II	Safre	Safre	Safre	Safre	Safre	Safre	Safre	Safre	Safre	Safre	Safre	Safre
5	SANDEEP .S	II	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep	Sandeep
6	SEYED AHAMED S .T	II	a	a	A	A	A	SAH	A	SAH	SAH	SAH	SAH	SAH
7	CHANDRU	II	Ch	Ch	Ch	Ch	Ch	Ch	Ch	Ch	Ch	Ch	Ch	Ch
8	MOHAMED SUHAIBU	III	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh
9	SRIRAM.N	III	SR	SR	SR	SR	A	SR						
10	KIFAN SHAKLINE.H	III	Kish	Kish	Kish	Kish	Kish	Kish	Kish	Kish	Kish	Kish	Kish	Kish
11	K MANIKANDAN	III	Mak	Mak	A	A	Mak	A	Mak	Mak	Mak	Mak	Mak	Mak
12	MOHAMED ANSAR ALI .N	III	Mah	Mah	Mah	Mah	Mah	Mah	A	MA	MA	MA	MA	MA
13	MOHAMED YAZIR	III	Mya	Mya	Mya	Mya	Mya	Mya	Mya	Mya	Mya	Mya	Mya	Mya
14	ARUN.T	III	Ar	Ar	Ar	Ar	Ar	Ar	Ar	Ar	Ar	Ar	Ar	Ar
15	MOHAMED AJMAL A. R	III	MAJ	MAJ	MAJ	MAJ	A	A	MAJ	MAJ	MAJ	MAJ	MAJ	MAJ
16	MOHAMED ISMAIL.A	III	a	MAJ	MAJ	MAJ	MAJ	MAJ	MAJ	A	MAJ	MAJ	MAJ	MAJ
17	MOHAMED ANAS.M	III	Mah	Mah	A	A	Mah	Mah	A	Mah	Mah	Mah	Mah	Mah
18	NAJUBUDEEN K	IV	a	Mah	Mah	Mah	Mah	Mah	Mah	A	A	A	A	A
19	SARATHKUMAR.N	IV	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh	Sh
20	RAMKUMAR.C	IV	Ram	Ram	Ram	Ram	Ram	Ram	Ram	Ram	Ram	Ram	Ram	Ram
21	SANJAY KUMAR.C	IV	San	a	San	A	A	San						
22	UMAR MUBARAK M	IV	umar	umar	umar	umar	umar	A	umar	umar	umar	umar	umar	umar
23	JAHEETH SALMAN. B	IV	a	Jeh	A	A	Jeh	Jeh	Jeh	Jeh	A	A	Jeh	Jeh
24	LAXSHAN M	IV	a	a	Laxsh	Laxsh	Laxsh	Laxsh	Laxsh	A	A	Laxsh	Laxsh	Laxsh
25	MOHAMED ARSATH M	IV	Mah	a	A	Mah								
			Total Present	20	21	19	20	21	22	22	21	21	21	23
			Total Absent	05	04	06	05	4	3	3	4	4	4	2
			Faculty sign	[Signature]										

PRINCIPAL  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai  
 Sipcot - IT Highway  
 Chennai - 603103

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103						
Department of Mechanical Engineering						
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)						
Academic Year: 2022-2023 (ODD SEM)					Year/Sem : II / III	
Subject Code & Name		ME3393 & Manufacturing Processes				
Faculty Name		Mr. Tharanikumar				
S.No	Register No	Name of the Student	Date			
			17/11	2/12	13/12	15/12
1	311821114004	GOKULNATH.D	1	A	1	1
2	311821114007	JASWIN KUMAR B	1	1	1	1
3	311821114011	MOHAMMED SAFREES	1	1	1	1
4	311821114014	SANDEEP . S	A	1	1	1
5	311821114015	SEYED AHAMED S .T	1	A	1	1
6	311821114302	CHANDRU	1	1	A	A
No of Students Present			5	4	5	5
Faculty Signature						

  
HoD/Mech

  
**PRINCIPAL**  
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Sipcot - IT Highway Egattur,  
Chennai - 603103.

**MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103**

**Department of Mechanical Engineering**

**SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)**

**Academic Year: 2022-2023 (ODD SEM)**

**Year/Sem : II / III**

**Subject Code & Name** ME3351 & Engineering Mechanics

**Faculty Name** Mr. S R MOHAN

S.No	Register No	Name of the Student	Date			
			15/12	12/12	14/12	16/12
1	311821114004	GOKULNATH.D	/	/	/	/
2	311821114006	HARI. M	/	/	/	/
3	311821114007	JASWIN KUMAR B	/	/	/	/
4	311821114011	MOHAMMED SAFREES	/	/	/	/
5	311821114014	SANDEEP . S	/	/	/	/
6	311821114015	SEYED AHAMED S .T	/	/	/	/
7	311821114302	CHANDRU	/	/	/	A
8	311821114701	MOHAMMED SAMEEM	/	A	/	A
<b>No of Students Present</b>			8	7	8	6
<b>Faculty Signature</b>						

  
 HoD/Mech

  
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MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

Department of Mechanical Engineering

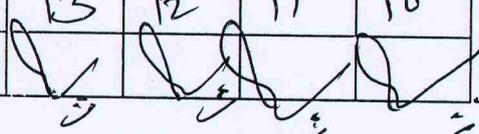
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)

Academic Year: 2022-2023 (ODD SEM)

Year/Sem : II / III

Subject Code & Name ME3391 & Engineering Thermodynamics

Faculty Name Mr. MUHAMMAD IRFAN A A

S.No	Register No	Name of the Student	Date			
			14/11	29/11	29/12	22/12
1	311821114002	ABDUL KAFFAR	/	/	/	/
2	311821114004	GOKULNATH.D	/	/	/	/
3	311821114005	HAJI PUTHU MYDEEN . S	/	/	/	A
4	311821114006	HARI. M	/	/	/	/
5	311821114007	JASWIN KUMAR B	/	/	/	/
6	311821114011	MOHAMMED SAFREES	/	/	A	A
7	311821114014	SANDEEP . S	/	A	A	/
8	311821114015	SEYED AHAMED S .T	/	/	/	/
9	311821114018	UDHAYAKUMAR.G	/	/	/	/
10	311821114302	CHANDRU	/	/	/	/
11	311821114303	MOHAMED ANWAR	/	/	/	A
12	311821114306	SWARUPAMALVAN	/	/	/	/
13	311821114701	MOHAMMED SAMEEM	/	/	/	/
No of Students Present			13	12	11	10
Faculty Signature						

S. P. R.  
HoD/Mech

  
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Sipcot IT Highway Egattur,  
Chennai - 603103.

## SLOW LEARNER LIST

Department of Mechanical Engineering

Academic Year: 2022-2023 (ODD SEM)

SEM / Yr : VII/IV

S.No	Name of the Student	No of Backlogs in previous semesters						Internal Assessment		
		Sem1	Sem2	Sem3	Sem4	Sem5	Sem6	IAT1	IAT2	IAT3
1	NAJUBUDEEN K	0	0	0	0	0	4	3	3	4
2	SARATHKUMAR.N	0	0	0	0	0	2	5	4	3
3	RAMKUMAR.C	0	0	0	0	0	0	4	3	5
4	SANJAY KUMAR.C	0	0	0	0	0	9	6	6	6
5	UMAR MUBARAK M	0	0	0	0	0	1	3	4	4
6	JAHETH SALMAN, B	0	0	0	0	0	0	3	3	4
7	LAXSHAN M	0	0	0	0	0	2	3	3	3
8	MOHAMED ARSATH M	0	0	0	0	0	0	4	3	4

  
Class Coordinator

Format No.: TLP 46

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salar, (OMR)  
Sipcoor - IT Highway Egattur,  
Chennai - 603103.

Rev. No.: 1.0

  
Sign of the HoD with date

Rev. Date: 04.01.21

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

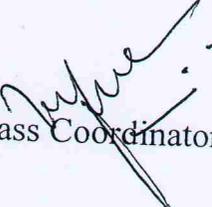
SLOW LEARNER LIST

Department of Mechanical Engineering

Academic Year: 2022-2023 (ODD SEM)

SEM / Yr : V/III

S.No	Name of the Student	No of Backlogs in previous semesters				Internal Assessment		
		Sem1	Sem2	Sem3	Sem4	IAT1	IAT2	IAT3
1	MOHAMED SUHAIBU	0	0	0	4	5	5	3
2	SRIRAM.N	0	0	0	6	5	5	5
3	KIFAN SHAKLINE.H	0	0	0	4	5	5	5
4	K MANIKANDAN	0	0	0	3	5	4	3
5	MOHAMED ANSAR ALI .N	0	0	0	3	4	4	4
6	MOHAMED YAZIR	0	0	0	3	4	3	3
7	ARUN.T	0	0	0	1	3	1	1
8	MOHAMED AJMAL A. R	0	0	0	4	5	5	3
9	MOHAMED ISMAIL.A	0	0	0	6	5	5	3
10	MOHAMED ANAS.M	0	0	0	2	4	4	3

  
Class Coordinator

  
Sign of the HoD with date

Format No.: TLP 46

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipeet - IT Highway Egattur,  
Chennai - 603103.

Rev. Date: 04.01.21

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

SLOW LEARNER LIST

Department of Mechanical Engineering

Academic Year: 2022-2023 (ODD SEM)

SEM / Yr : III/II

S.No	Name of the Student	No of Backlogs in		Internal Assessment		
		Sem1	Sem2	IAT1	IAT2	IAT3
1	GOKULNATH.D	1	3	5	5	5
2	HARI. M	0	4	6	5	4
3	JASWIN KUMAR B	2	4	6	6	5
4	MOHAMMED SAFREES	1	4	6	6	6
5	SANDEEP . S	4	4	6	5	5
6	SEYED AHAMED S .T	3	2	6	6	5
7	CHANDRU	NA	NA	NA	6	6

  
Class Coordinator

  
Sign of the HoD with date

Format No.: TLP 46

Rev. Date: 04.01.21

  
**PRINCIPAL**  
Mohamed Sathak A. J. College of Engineering  
No.32 - Rajahmundry Road, Satal (OMR)  
N.S. Road, Rajahmundry, Andhra Pradesh.  
Sipcothanal - 603103.  
Chennai

MOHAMED SATHAK A J COLLEGE OF ENGINEERING			
DEPARTMENT OF MECHANICAL ENGINEERING			
STUDY HOUR ROASTER DUTY ALLOCATION TIME : 4.00 PM - 5.00 PM			
S.NO	DATE	FACULTY NAME	ROOM NO
1	7.11.22	Dr. S. Prasath	329
2	8.11.22	Mr. V. Vigneshwaran	329
3	9.11.22	Mr. J. Rajesh	329
4	10.11.22	Mr. K K Vinothkumar	329
5	14.11.22	Mr. A. A. Md. Irfan	329
6	15.11.22	Mr. S. R. Mohan	329
7	16.11.22	Mr. J. Rajesh	329
8	17.11.22	Mr. Tharanikumar	329
9	18.11.22	Mrs. Yamini	329
10	19.11.22	Mr. J. Rajesh	329
11	21.11.22	Mr. D. Sakthivel	329
12	22.11.22	Mr. K K Vinothkumar	329
13	23.11.22	Mr. D. Sakthivel	329
14	24.11.22	Dr. Saravanan	329
15	25.11.22	Mrs. Yamini	329
16	28.11.22	Mr. V. Vigneshwaran	329
17	29.11.22	Mr. A. A. Md. Irfan	329
18	30.11.22	Mrs. Yamini	329
19	01.12.22	Mr. J. Rajesh	329
20	02.12.22	Mr. Tharanikumar	329

PREPARED BY

PRINCIPAL  
 Mohamed Sathak A.J. College of Engineering  
 No. 34, Rajiv Gandhi Salai (O.M.R.)  
 Chennai - 600103.  
 No. 34 Rajiv Gandhi Salai (O.M.R.)  
 Chennai - 600103.

HoD

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

Department of Mechanical Engineering

SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)

Academic Year: 2022-2023 (ODD SEM)

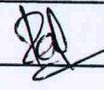
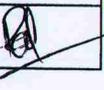
Year/Sem : II / III

Subject Code & Name

ME3392 & Engineering Materials and Metallurgy

Faculty Name

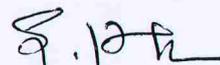
Mr. J. Rajesh

S.No	Register No	Name of the Student	Date			
			9.11.22	16.11.22	19.11.22	1.12.22
1	311821114004	GOKULNATH.D	P	/	/	/
2	311821114007	JASWIN KUMAR B	P	/	/	/
3	311821114011	MOHAMMED SAFREES	P	/	/	A
4	311821114014	SANDEEP . S	P	/	/	/
5	311821114015	SEYED AHAMED S .T	P	A	A	/
6	311821114302	CHANDRU	A	/	A	/
No of Students Present			5	5	4	5
Faculty Signature						

  
HoD/Mech

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103						
Department of Mechanical Engineering						
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)						
Academic Year: 2022-2023 (ODD SEM)					Year/Sem : II / III	
Subject Code & Name		MA3351 & Transforms and Partial Differential Equations				
Faculty Name		Mr. SUBRAMANI				
S.No	Register No	Name of the Student	Date			
			12.9.22	19/9	10/10	17/10
1	311821114004	GOKULNATH.D	/	/	/	/
2	311821114005	HAJI PUTHU MYDEEN . S	/	/	A	/
3	311821114006	HARI. M	/	/	/	/
4	311821114007	JASWIN KUMAR B	A	/	/	/
5	311821114011	MOHAMMED SAFREES	/	/	/	/
6	311821114014	SANDEEP . S	/	/	/	/
7	311821114015	SEYED AHAMED S . T	/	/	/	A
8	311821114018	UDHAYAKUMAR.G	/	/	/	/
9	311821114302	CHANDRU	/	/	/	/
10	311821114303	MOHAMED ANWAR	A	A	/	/
11	311821114306	SWARUPAMALVAN	/	/	/	/
12	311821114701	MOHAMMED SAMEEM	/	/	/	/
No of Students Present			10	11	11	11
Faculty Signature			Sub.	Sub	Sub	Sub

  
HOD/Mech



**PRINCIPAL**  
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Sipcot - IT Highway Egattur,  
Chennai - 603103.

**MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103**

Department of Mechanical Engineering

**SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)**

Academic Year: 2022-2023 (ODD SEM)

Year/Sem : II / III

Subject Code & Name      CE3391 & Fluid Mechanics and Machinery

Faculty Name                 Dr.G.Ramesh

S.No	Register No	Name of the Student	Date			
			18-9-22	20/9	11/10	18/10
1	311821114004	GOKULNATH.D	/	/	/	/
2	311821114005	HAJI PUTHU MYDEEN . S	/	/	/	/
3	311821114006	HARI. M	/	/	/	/
4	311821114007	JASWIN KUMAR B	/	/	/	/
5	311821114011	MOHAMMED SAFREES	/	/	/	/
6	311821114014	SANDEEP . S	/	/	/	/
7	311821114015	SEYED AHAMED S .T	/	A	/	/
8	311821114018	UDHAYAKUMAR.G	/	/	/	/
9	311821114302	CHANDRU	/	/	A	/
10	311821114306	SWARUPAMALVAN	/	/	/	/
11	311821114701	MOHAMMED SAMEEM	/	A	/	/
<b>No of Students Present</b>			11	9	10	11
<b>Faculty Signature</b>						

  
HoD/Mech



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Mohamed Sathak A.J. College of Engineering  
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Sipcot - IT Highway Egattur,  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

Department of Mechanical Engineering

SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)

Academic Year: 2022-2023 (ODD SEM)

Year/Sem : III / V

Subject Code & Name ME8593 & Design of Machine Elements

Faculty Name Mr. Sakthivel

S.No	Register No	Name of the Student	Date			
			21/12/22	23/11	14/12	16/12
1	311820114002	ARUN.T	/	/	/	/
2	311820114005	K MANIKANDAN	/	/	/	/
3	311820114007	MOHAMED AJMAL A. R	/	/	/	/
4	311820114008	MOHAMED GHOUSE NAGUTHA. M	/	/	/	/
5	311820114011	MOHAMED ISMAIL.A	A	/	/	A
6	311820114305	KIFAN SHAKLINE.H	/	/	/	/
7	311820114306	KISHORE P	/	/	/	/
8	311820114307	MOHAMED ANAS.M	/	/	/	/
9	311820114308	MOHAMED ANSAR ALI .N	/	A	/	/
10	311820114312	MOHAMED SUHAIBU	/	/	/	/
11	311820114313	MOHAMED YAZIR	/	/	/	/
12	311820114320	SRIRAM.N	A	/	/	/
No of Students Present			10	11	12	11
Faculty Signature						

  
HoD/Mech

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103						
Department of Mechanical Engineering						
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)						
Academic Year: 2022-2023 (ODD SEM)				Year/Sem : III / V		
Subject Code & Name		ME8501 & Metrology and Measurements				
Faculty Name		Mr. Tharanikumar				
S.No	Register No	Name of the Student	Date			
			17/11	5/12	12/12	15/12
1	311820114004	IMTHIYAS. A	/	/	A	/
2	311820114005	K MANIKANDAN	/	/	/	/
3	311820114007	MOHAMED AJMAL A. R	/	/	/	/
4	311820114008	MOHAMED GHOUSE NAGUTHA. M	/	/	/	/
5	311820114011	MOHAMED ISMAIL.A	/	A	/	/
6	311820114305	KIFAN SHAKLINE.H	/	/	/	/
7	311820114311	MOHAMED MUFEED	/	/	/	/
8	311820114308	MOHAMED ANSAR ALI .N	/	/	/	/
9	311820114312	MOHAMED SUHAIBU	/	/	/	/
10	311820114313	MOHAMED YAZIR	/	/	/	/
No of Students Present			10	9	9	10
Faculty Signature						

HoD/Mech

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Mohamed Sathak A.J. College of Engineering  
No 94, Rajiv Gandhi Salai (OMR)  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

Department of Mechanical Engineering

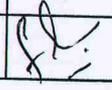
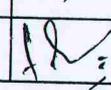
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)

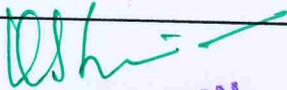
Academic Year: 2022-2023 (ODD SEM)

Year/Sem : III / V

Subject Code & Name ME8594 & Dynamics of Machines

Faculty Name Dr. SARAVANAN

S.No	Register No	Name of the Student	Date			
			22/9/22	10/10	24/11	7/12
1	311820114002	ARUN.T	/	/	/	/
2	311820114003	DINESH. M	/	/	/	/
3	311820114005	K MANIKANDAN	/	A	/	/
4	311820114007	MOHAMED AJMAL A. R	/	/	/	/
5	311820114008	MOHAMED GHOUSE NAGUTHA. M	/	/	/	A
6	311820114009	MOHAMED IJAZ. M	/	/	/	/
7	311820114011	MOHAMED ISMAIL.A	/	A	/	/
8	311820114305	KIFAN SHAKLINE.H	/	/	/	/
9	311820114306	KISHORE P	/	/	/	/
10	311820114307	MOHAMED ANAS.M	A	/	/	/
11	311820114308	MOHAMED ANSAR ALI .N	/	/	/	/
12	311820114312	MOHAMED SUHAIBU	/	/	/	/
13	311820114313	MOHAMED YAZIR	/	/	/	A
14	311820114314	MOHAMED THAISEER S	/	/	/	/
15	311820114316	MOHANRAJ.R	/	/	/	/
16	311820114317	MOHAMED AGIL ZUBIER	/	/	/	/
17	311820114320	SRIRAM.N	/	/	/	/
No of Students Present			16	15	17	16
Faculty Signature						

  
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 Chennai - 603103.

  
 HoD/Mech

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

Department of Mechanical Engineering

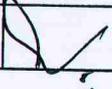
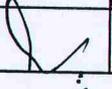
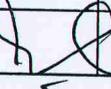
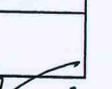
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)

Academic Year: 2022-2023 (ODD SEM)

Year/Sem : III / V

Subject Code & Name ME8595 & Thermal Engineering- II

Faculty Name Mr. MUHAMMAD IRFAN

S.No	Register No	Name of the Student	Date			
			14/11	28/11	02/12	03/12
1	311820114002	ARUN. T	/	/	/	/
2	311820114003	DINESH. M	/	A	A	/
3	311820114005	K MANIKANDAN	/	A	/	A
4	311820114007	MOHAMED AJMAL A. R	/	/	A	A
5	311820114008	MOHAMED GHOUSE NAGUTHA. M	/	/	A	/
6	311820114011	MOHAMED ISMAIL.A	/	/	/	/
7	311820114013	MOHAMMED MANSOOR. S	/	/	/	/
8	311820114304	HASAN HAFIL	/	/	/	/
9	311820114305	KIFAN SHAKLINE.H	/	A	A	/
10	311820114306	KISHORE P	/	/	/	/
11	311820114307	MOHAMED ANAS.M	/	A	/	/
12	311820114308	MOHAMED ANSAR ALI .N	/	/	A	/
13	311820114311	MOHAMED MUFEED	A	/	/	A
14	311820114312	MOHAMED SUHAIBU	/	/	A	/
15	311820114313	MOHAMED YAZIR	/	/	A	/
16	311820114314	MOHAMED THAISEER S	/	A	A	A
17	311820114320	SRIRAM.N	/	/	/	/
18	311820114322	VIJAY	/	/	/	A
No of Students Present			18	16	10	15
Faculty Signature						

  
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MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103						
Department of Mechanical Engineering						
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)						
Academic Year: 2022-2023 (ODD SEM)				Year/Sem : III / V		
Subject Code & Name		ORO551 & RENEWABLE ENERGY SOURES				
Faculty Name		Dr. VADIVELAN				
S.No	Register No	Name of the Student	Date			
			12/9/22	19/9	10/10	17/10
1	311820114005	K MANIKANDAN	/	/	/	/
2	311820114007	MOHAMED AJMAL A. R	/	/	/	/
3	311820114008	MOHAMED GHOUSE NAGUTHA. M	/	/	/	/
4	311820114011	MOHAMED ISMAIL.A	/	a	/	/
5	311820114305	KIFAN SHAKLINE.H	/	/	/	a
6	311820114306	KISHORE P	/	/	/	a
7	311820114308	MOHAMED ANSAR ALI .N	/	/	/	a
8	311820114312	MOHAMED SUHAIBU	/	/	/	a
9	311820114313	MOHAMED YAZIR	/	/	/	/
10	311820114320	SRIRAM.N	/	a	a	/
No of Students Present			10	8	9	6
Faculty Signature			Van	Van	Van	Van

S.P.R  
HoD/Mech

  
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Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103						
Department of Mechanical Engineering						
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)						
Academic Year: 2022-2023 (ODD SEM)					Year/Sem : IV / VII	
Subject Code & Name		ME8793 & Process Planning and Cost Estimation				
Faculty Name		Dr.A.Saravanan				
S.No	Register No	Name of the Student	Date			
			9/9/22	10/10	24/11	7/12
1	311819114005	GOKUL M	/	/	/	/
2	311819114011	MOHAMED ARSATH M	/	/	/	/
3	311819114016	MOHAMMED ISMAIL M	/	/	/	/
4	311819114019	NAJUBUDEEN K	/	/	/	/
5	311819114021	UMAR MUBARAK M	/	/	/	a
6	311819114305	RAMKUMAR.C	/	a	/	/
7	311819114311	SARATHKUMAR.N	/	/	a	a
No of Students Present			7	6	6	5
Faculty Signature			<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>

*[Signature]*  
HoD/Mech

*[Signature]*  
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No.34, Rajiv Gandhi Salai (OMR)  
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Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103						
Department of Mechanical Engineering						
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)						
Academic Year: 2022-2023 (ODD SEM)					Year/Sem : IV / VII	
Subject Code & Name		ME8073 & Unconventional Machining Processes				
Faculty Name		Mr. SAKTHIVEL				
S.No	Register No	Name of the Student	Date			
			21.11.22	23.11.22	14.12	16.12
1	311819114005	GOKUL M	/	/	/	/
2	311819114019	NAJUBUDEEN K	a	/	/	/
3	311819114021	UMAR MUBARAK M	/	/	/	/
4	311819114306	SALAUDEEN BADUSHA	/	/	a	/
5	311819114310	VIJAYA SARATHI. V	a	/	a	/
6	311819114311	SARATHKUMAR.N	/	/	/	a
No of Students Present			4	6	4	5
Faculty Signature						

  
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Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 600113.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103						
Department of Mechanical Engineering						
SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)						
Academic Year: 2022-2023 (ODD SEM)				Year/Sem : IV / VII		
Subject Code & Name		ME8792 & Power Plant Engineering				
Faculty Name		Mrs. YAMINI				
S.No	Register No	Name of the Student	Date			
			18.11.22	25/11	30/11/22	5/12/22
1	311819114005	GOKUL M	/	/	/	A
2	311819114011	MOHAMED ARSATH M	/	/	/	/
3	311819114016	MOHAMMED ISMAIL M	/	A	/	/
4	311819114019	NAJUBUDEEN K	/	/	/	/
5	311819114021	UMAR MUBARAK M	A	/	/	/
6	311819114306	SALAUDEEN BADUSHA	/	/	/	/
7	311819114310	VIJAYA SARATHI. V	/	/	/	/
8	311819114311	SARATHKUMAR.N	/	/	/	/
No of Students Present			7	7	8	7
Faculty Signature			<i>Yamini</i>	<i>Yamini</i>	<i>Yamini</i>	<i>Yamini</i>

*S.P.A*  
HoD/Mech

*Principal*  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

Department of Mechanical Engineering

SLOW LEARNERS REMEDIAL CLASSES (4.00 - 5.00 PM)

Academic Year: 2022-2023 (ODD SEM)

Year/Sem : IV / VII

Subject Code & Name OMF751 & Lean Six Sigma

Faculty Name Dr.S.Prasath

S.No	Register No	Name of the Student	Date			
			17/10/22	24/11/22	17/11/22	6/12/22
1	311819114005	GOKUL M	/	/	a	/
2	311819114006	GUNAL. S	/	/	/	/
3	311819114008	JAHEETH SALMAN. B	/	/	/	/
4	311819114011	MOHAMED ARSATH M	a	/	/	/
5	311819114016	MOHAMMED ISMAIL M	/	/	/	/
6	311819114019	NAJUBUDEEN K	/	/	a	/
7	311819114021	UMAR MUBARAK M	a	/	/	/
8	311819114306	SALAUDEEN BADUSHA	/	/	/	/
9	311819114310	VIJAYA SARATHI. V	/	/	/	/
10	311819114311	SARATHKUMAR.N	/	/	a	/
No of Students Present			8	10	7	10
Faculty Signature			S.P.R	S.P.R	S.P.R	S.P.R

S.P.R  
HOD/Mech

  
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Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

Department of Mechanical Engineering

SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)

Academic Year: 2022-2023 (ODD SEM)

Year/Sem : IV / VII

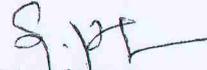
Subject Code & Name

ME8097 & Non Destructive Testing and Evaluation

Faculty Name

Mr. J Rajesh

S.No	Register No	Name of the Student	Date			
			9/11/22	16.11.22	19/11	1/12/22
1	311819114005	GOKUL M	1	1	1	1
2	311819114019	NAJUBUDEEN K	1	a	1	1
3	311819114021	UMAR MUBARAK M	1	1	1	1
4	311819114306	SALAUDEEN BADUSHA	1	1	1	a
5	311819114310	VIJAYA SARATHI. V	1	a	1	1
6	311819114311	SARATHKUMAR.N	1	1	a	1
No of Students Present			6	4	5	5
Faculty Signature						

  
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MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

Department of Mechanical Engineering

SLOW LEARNERS REMEDICAL CLASSES (4.00 - 5.00 PM)

Academic Year: 2022-2023 (ODD SEM)

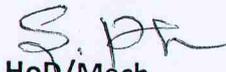
Year/Sem : IV / VII

Subject Code & Name ME8791 & Mechatronics

Faculty Name Mrs.SONADEVI

S.No	Register No	Name of the Student	Date			
			12-9-22	19/9	10/10	17/10
1	311819114005	GOKUL M	/	/	/	/
2	311819114006	GUNAL. S	/	/	/	/
3	311819114008	JAHETH SALMAN. B	/	A	/	/
4	311819114010	LAXSHAN M	/	/	/	/
5	311819114011	MOHAMED ARSATH M	/	/	/	/
6	311819114016	MOHAMMED ISMAIL M	/	/	/	/
7	311819114019	NAJUBUDEEN K	/	/	/	/
8	311819114021	UMAR MUBARAK M	/	/	/	/
9	311819114305	RAMKUMAR.C	/	/	/	/
10	311819114306	SALAUDEEN BADUSHA	/	A	A	/
11	311819114310	VIJAYA SARATHI. V	A	/	/	/
12	311819114311	SARATHKUMAR.N	/	/	/	/
No of Students Present			11	10	11	12
Faculty Signature						

  
**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

  
 HoD/Mech

**MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103**  
**TOPPER STUDENTS LIST**

**Department of Mechanical Engineering**  
**Academic year 2022 -2023 ODD Sem**

**Year/Semester: IV/VII**

S.No	Name of the Student	CGPA upto Sixth semester							Methods of Encouraging bright students				
		SEM 1	SEM 2	SEM 3	SEM 4	SEM 5	SEM 6	CGPA	Self Learning	Industry Projects	Competition	Higher Studies Awareness	Scholarship
1	SYED SUFFIYAN	-	-	8.4	8.9	9.38	8	8.5	✓			✓	
2	ARSATH A	-	-	8.52	8.81	9.14	8.6	8.82	✓			✓	
3	KABIR MOHAMED. A	8.64	9.6	8.3	8.62	8.73	8.03	8.54	✓			✓	
4	MOHAMMED KURSHITH ALI. M	7.44	8.46	8.71	8.42	8.56	8.57	8.56	✓		✓	✓	
5	ATEF JAMALUDEEN N	6.98	9.64	8.6	8.54	8.91	7.91	8.73	✓			✓	
6	AAAYATHUL MUFARAK. A	7.04	8.54	8.72	8.64	8.81	7.98	8.35	✓		✓	✓	
7	MOHAMMED IRFAAN P	6.96	8.2	8.08	8.79	8.96	8.3	8.19	✓			✓	

*S. S. Sathak*  
 Class Coordinator

*M. Sathak A. J.*

**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR) Rev. No.: 1.0  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

*S. P. A.*  
 Sign of the HoD with date

Format No.: TLP 47

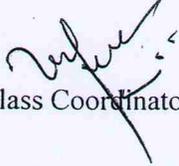
Rev. Date: 04.01.21

**MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103**  
**TOPPER STUDENTS LIST**

**Department of Mechanical Engineering**  
**Academic year 2022 -2023 ODD Sem**

**Year/Semester: III/V**

S. No	Name of the Student	CGPA upto Third semester					Methods of Encouraging bright students				
		SEM 1	SEM 2	SEM 3	SEM 4	CGPA	Self Learning	Industry Projects	Competition	Higher Studies Awareness	Scholarship
1	MOHAMED AFROSE M	8.01	8.18	8.38	7.1	7.91	✓				
2	MOHAMED IJAZ M	7.65	8.08	7.82	7.1	7.6	✓				
3	MOHAMED ILIAS S	7.8	7.85	8.23	7	7.75	✓				
4	SALMAN S	8.25	9.02	8.93	7.9	8.3	✓				
5	UMAR JAFFER ALI A	8.1	8.82	7.98	8.13	8.28	✓		✓		
6	MOHAMED ASIF M	NA	NA	9.01	7.21	8.16	✓				

  
 Class Coordinator

  
 Sign of the HoD with date

Format No.: TLP 47

  
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 Mohamed Sathak A.J. College of Engineering  
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 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

Rev. Date: 04.01.21

**MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103**  
**TOPPER STUDENTS LIST**

**Department of Mechanical Engineering**  
**Academic year 2022 -2023 ODD Sem**

**Year/Semester: II/III**

S.No	Name of the Student	CGPA upto Sixth			Methods of Encouraging bright students				
		SEM 1	SEM 2	CGPA	Self Learning	Industry Projects	Competition	Higher Studies Awareness	Scholarship
1	AADIL T	7.38	8.05	7.7	✓				
2	ABDUL KAFFAR	7.14	7.89	7.51	✓				
3	DHANUSH ADITHYA S	8.38	8.72	8.55	✓		✓		
4	MOHAMED FAZID S	8.42	8.32	8.22	✓				
5	SHAIK IRFAN	8.714	8.68	8.69	✓		✓		
6	SHAILESH KUMAR P	7.38	7.77	7.57	✓				

Class Coordinator

Sign of the HoD with date

Format No.: TLP 47

Rev. Date: 04.01.21

  
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Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)



Department of Mechanical Engineering

Academic Year (2022-2023 – ODD Sem)

Additional Library Card Issue Details

S.NO	NAME	YEAR	NO OF CARD ISSUED
1	AADIL T	II	6
2	ABDUL KAFFAR	II	6
3	DHANUSH ADITHYA S	II	6
4	MOHAMED FAZID S	II	6
5	SHAIK IRFAN	II	6
6	SHAILESH KUMAR P	II	6

  
Staff In-charge  
(M. MUHAMMAD IRFAN)  
AP-MECH)

  
HoD

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING

STUDY HOUR ROASTER DUTY ALLOCATION TIME : 4.00 PM - 5.00 PM

S.NO	DATE	FACULTY NAME	ROOM NO
1	7.11.22	Mr. K K Vinothkumar	103
2	8.11.22	Mr. A. A. Md. Irfan	103
3	9.11.22	Mr. S. R. Mohan	103
4	10.11.22	Mr. J. Rajesh	103
5	14.11.22	Mr. Tharanikumar	103
6	15.11.22	Mrs. Yamini	103
7	16.11.22	Mr. K K Vinothkumar	103
8	17.11.22	Mr. V. Vigneshwaran	103
9	18.11.22	Mr. J. Rajesh	103
10	19.11.22	Mr. D. Sakthivel	103
11	21.11.22	Dr. S. Prasath	103
12	22.11.22	Mr. D. Sakthivel	103
13	23.11.22	Mr. A. A. Md. Irfan	103
14	24.11.22	Mrs. Yamini	103
15	25.11.22	Mr. Tharanikumar	103
16	28.11.22	Mr. V. Vigneshwaran	103
17	29.11.22	Dr. Saravanan	103
18	30.11.22	Mr. S. R. Mohan	103
19	01.12.22	Mr. K K Vinothkumar	103
20	02.12.22	Mr. A. A. Md. Irfan	103

PREPARED BY

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

  
HoD

MOHAMED SATHAK A J COLLEGE OF ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING

ACADEMIC YEAR - 2022-2023 ODD SEM - COE ATTENDANCE - ROOM NO - 103

DAYSCHOLAR STUDENTS STUDY		YEAR	DATE												
S NO	STUDENTS NAME		7.11.22	8.11.22	9.11.22	10.11.22	11.11.22	12.11.22	13.11.22	14.11.22	15.11.22	16.11.22	17.11.22	18.11.22	19.11.22
1	AADIL T	II	Aadil	Aadil	Aadil	Aadil	Aadil	Aadil	Aadil	Aadil	Aadil	Aadil	Aadil	Aadil	Aadil
2	ABDUL KAFFAR	II	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>	<del>Kaffar</del>
3	DHANUSH ADITHYA S	II	Dhanush	Dhanush	a	Dhanush	Dhanush								
4	MOHAMED FAZID S	II	Fazid	Fazid	a	Fazid	A	Fazid	A						
5	SHAIK IRFAN	II	Shaik	Shaik	Shaik	A	Shaik	Shaik	Shaik	Shaik	Shaik	Shaik	A	Shaik	A
6	SHAILESH KUMAR P	II	Shailesh	Shailesh	Shailesh	Shailesh	Shailesh	Shailesh	Shailesh	Shailesh	Shailesh	Shailesh	Shailesh	Shailesh	Shailesh
7	MOHAMED AFROSE M	III	A	<del>A</del>	<del>A</del>	<del>A</del>	<del>A</del>	<del>A</del>	<del>A</del>	<del>A</del>	<del>A</del>	<del>A</del>	<del>A</del>	<del>A</del>	<del>A</del>
8	MOHAMED IJAZ M	III	Ijaz	Ijaz	Ijaz	Ijaz	Ijaz	Ijaz	Ijaz	Ijaz	Ijaz	Ijaz	Ijaz	Ijaz	Ijaz
9	MOHAMED ILIAS S	III	Mohamed	Mohamed	a	Mohamed	Mohamed								
10	SALMAN S	III	<del>Salman</del>	Salman	a	Salman	Salman	Salman	Salman	Salman	a	Salman	Salman	Salman	Salman
11	UMAR JAFFER ALI A	III	Jaffer	Jaffer	Jaffer	Jaffer	a	Jaffer	Jaffer	Jaffer	Jaffer	Jaffer	A	Jaffer	Jaffer
12	MOHAMED ASIF M	III	A	Asif	Asif	Asif	a	Asif	Asif	Asif	Asif	Asif	A	Asif	Asif
13	SYED SUFFIYAN	IV	Syed	Syed	Syed	Syed	Syed	Syed	Syed	Syed	Syed	Syed	Syed	Syed	Syed
14	ARSATH A	IV	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>	<del>Arsath</del>
15	KABIR MOHAMED. A	IV	Kabir	Kabir	Kabir	Kabir	Kabir	Kabir	Kabir	Kabir	Kabir	Kabir	Kabir	Kabir	Kabir
16	MOHAMMED KURSHITH ALI. M	IV	<del>Kurshith</del>	a	<del>Kurshith</del>	A									
17	ATEF JAMALUDEEN N	IV	Atef	a	Atef	Atef									
18	AA YATHUL MUFARAK. A	IV	<del>Mufarak</del>	a	<del>Mufarak</del>	A	<del>Mufarak</del>	<del>Mufarak</del>							
19	MOHAMMED IRFAAN P	IV	Irfaan	Irfaan	Irfaan	Irfaan	Irfaan	Irfaan	Irfaan	Irfaan	Irfaan	Irfaan	Irfaan	Irfaan	Irfaan
Total Present		-	17	16	15	17	17	19	18	17	17	17	17	16	
Total Absent		-	02	03	04	02	02	NIL	1	02	02	02	03		
Faculty sign		-													

**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Satalai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING

DEPARTMENT OF MECHANICAL ENGINEERING

ACADEMIC YEAR - 2022-2023 ODD SEM - COE ATTENDANCE - ROOM NO - 103

DAY SCHOLAR STUDENTS STUDY		YEAR	DATE									
S NO	STUDENTS NAME		21/11	22/11	23/11	24/11	25/11	28/11	29/11	30/11	1/12	2/12
1	AADIL T	II	A	A	A	A	A	A	A	A	A	A
2	ABDUL KAFFAR	II	A	A	A	A	A	A	A	A	A	A
3	DHANUSH ADITHYA S	II	A	A	A	A	A	A	A	A	A	A
4	MOHAMED FAZID S	II	A	A	A	A	A	A	A	A	A	A
5	SHAIK IRFAN	II	A	A	A	A	A	A	A	A	A	A
6	SHAILESH KUMAR P	II	A	A	A	A	A	A	A	A	A	A
7	MOHAMED AFROSE M	III	A	A	A	A	A	A	A	A	A	A
8	MOHAMED IJAZ M	III	A	A	A	A	A	A	A	A	A	A
9	MOHAMED ILIAS S	III	A	A	A	A	A	A	A	A	A	A
10	SALMAN S	III	A	A	A	A	A	A	A	A	A	A
11	UMAR JAFFER ALI A	III	A	A	A	A	A	A	A	A	A	A
12	MOHAMED ASIF M	III	A	A	A	A	A	A	A	A	A	A
13	SYED SUFFIYAN	IV	A	A	A	A	A	A	A	A	A	A
14	ARSATH A	IV	A	A	A	A	A	A	A	A	A	A
15	KABIR MOHAMED. A	IV	A	A	A	A	A	A	A	A	A	A
16	MOHAMMED KURSHITH ALI. M	IV	A	A	A	A	A	A	A	A	A	A
17	ATEF JAMALUDEEN N	IV	A	A	A	A	A	A	A	A	A	A
18	AA YATHUL MUFARAK. A	IV	A	A	A	A	A	A	A	A	A	A
19	MOHAMMED IRFAAN P	IV	A	A	A	A	A	A	A	A	A	A
Total Present			16	17	18	17	16	17	16	16	16	15
Total Absent			3	2	1	2	3	2	3	3	3	4
Faculty sign			[Signature]									

PRINCIPAL  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (Old IIT)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

**MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103**  
**STUDENT CO - CURRICULAR PARTICIPATION / ACHEIVEMENTS DETAILS**

Department : Mechanical Engineering

Academic Year : 2022-2023 (Odd Sem)

S.No	Name of the Students	Year/ Sem/Sec	Name of the Competition	Date	Organised by	Level	Name of the Event	Prizes Won	Remarks
1	UMAR JAFFAR ALI	III / V	Fluid Power Circuits	21th SEP 2022	MSAJCE		Workshop		
2	DHANUSH ADITHYA S	II / III	ROBOTICS	SEP 2022	NPTEL	International	Online Learning	Elite	
3	SHAIK IRFAN	II / III	Fusion 360 Design Challenge	7th & 8th OCT 2022	SSN College of Engineering		Two Days Boot Camp		
4	DHANUSH ADITHYA S	II / III	Fusion 360 Design Challenge	7th & 8th OCT 2022	SSN College of Engineering		Two Days Boot Camp		
5	MOHAMMED KURSHITH ALI. M	IV / VII	Appreciation for Volunteer	16th OCT 2022	SAEINDIA		SAE Southern Section Events		
6	DHANUSH ADITHYA S	II / III	Solidworks	18th OCT 2022	Internshala		Online Learning		Top performer
7	SHAIK IRFAN	II / III	ADVANCED MACHINING PROCESSES	OCT 2022	NPTEL	International	Online Learning	Elite	
8	DHANUSH ADITHYA S	II / III	Job Hunt	12th Nov 2022	Internshala	International	Online Learning		Top performer

Supporting Documents

1. Copy of Certificate

2. Photographs



**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

  
 Sign of the HoD with date

Format No : TLP 36

Rev.No : 1.0

Rev. Date : 04.01.21



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)



Department of Mechanical Engineering

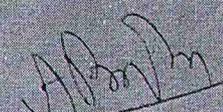
Heartily Congratulates

Anna University Examinations – April/May 2022 (Over All Toppers)

RANK	II YEAR	III YEAR	IV YEAR
I	Shaik Irfan K (311821114016)  CGPA - 8.62	Salman S (311820114015)  CGPA - 8.3	Atef Jamaludeen N (311819114003)  CGPA - 8.73
	Dhanush Adithya S (311821114003)  CGPA - 8.55	Umar Jaffar Ali A (311820114018)  CGPA - 8.28	Kabir Mohamed A (311819114009)  CGPA - 8.54
	Mohamed Fazid S (311821114010)  CGPA : 8.32	Mohamed Asif M (311820114309)  CGPA - 8.16	Syed Suffiyan (311819114308)  CGPA - 8.5

S. P. A.  
HOD/MECH

  
Mohamed Sathak A.J. College of Engineering  
No. 34, Rajiv Gandhi Salai (G.M.T.)  
Sipahsala, Highway E gattur,  
Chennai - 603103.

  
HEAD - AC



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

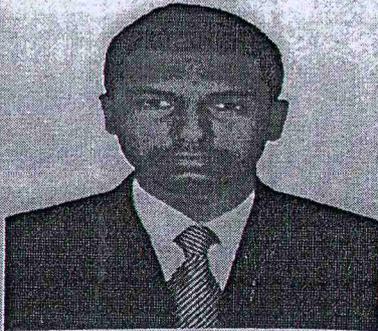
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)



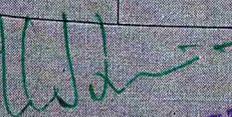
Department of Mechanical Engineering

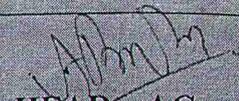
Heartily Congratulates

Anna University Examinations – April/May 2022 (Current Semester Toppers)

RANK	II YEAR	III YEAR	IV YEAR
I	Dhanush Adithya S (311821114003)  GPA - 8.72	Umar Jaffar Ali A (311820114018)  GPA - 8.13	Mohamed irfaan P (311819114015)  GPA - 8.30
II	Shaik Irfan K (311821114016)  GPA - 8.68	Salman S (311820114015)  GPA - 7.9	Kabir Mohamed A (311819114009)  GPA - 8.03
III	Mohamed Fazid S (311821114010)  GPA : 8.22	Mohamed Asif M (311820114309)  GPA - 7.21	Atef Jamaludeen N (311819114003)  GPA - 7.91

S. P. H  
HOD/MECH

  
PRINCIPAL  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Enattur,  
Chennai - 603103

  
HEAD - AC



# MOHAMED SATHAK AJ COLLEGE OF ENGINEERING

(APPROVED BY AICTE-NEW DELHI AFFILIATED TO ANNA UNIVERSITY)

34, RAJIV GANDHI SALAI (OMR), SIRUSERI IT PARK, CHENNAI - 603103



## Certificate of Participation

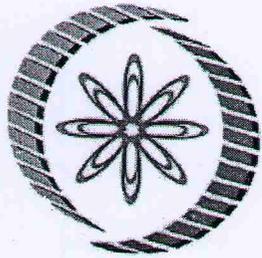
This is to certify that Mr/Ms/D<sup>r</sup>. UMAR JAFFAR ALI A MECH  
M.SAJCE has participated in the "Workshop on Fluid  
Power Circuits" organized by the Department of Mechanical Engineering, Mohamed Sathak  
A J College of Engineering, held on 21.09.2022

*S. Pr*  
*21/9/22*  
CONVENOR  
(Dr.S.PRASATH)

*[Signature]*  
Mohamed Sathak A J College of Engineering  
No. 34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

*[Signature]*  
*21/09/22*  
PRINCIPAL  
(Dr.K.S.SRINIVASAN)

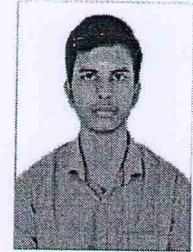




Elite

# NPTEL Online Certification

(Funded by the MoE, Govt. of India)



This certificate is awarded to  
**DHANUSH ADITHYA S**  
for successfully completing the course

## Robotics

with a consolidated score of **66** %

Online Assignments	22.92/25	Proctored Exam	43.5/75
--------------------	----------	----------------	---------

Total number of candidates certified in this course: **418**

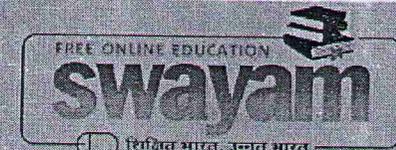
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

Jul-Sep 2022  
(8 week course)

**Prof. Debjani Chakraborty**  
Coordinator, NPTEL  
IIT Kharagpur



Indian Institute of Technology Kharagpur



Roll No: NPTEL22ME109S13270219

To validate the certificate



No. of credits recommended: 2 or 3



# CERTIFICATE

OF APPRECIATION

THIS CERTIFICATE IS PRESENTED TO

*Shaik Irfan K*

from Mohamed sathak A J college of engineering for participating in a Two-Day Boot Camp for "Fusion 360 Design Challenge" under the aegis of "Naan Mudhalvan" programme, organized by the Department of Biomedical Engineering, SSNCE and AUTODESK Corporation on October 7th and 8th, 2022

DR. J. VIJAY  
CO-ORDINATOR

DR. A. KAVITHA  
CONVENER

*Wsdh*

Principal  
Sathak A J College of Engineering  
4 Rajahmundry, Egattur,  
Chennai - 606 103



# CERTIFICATE

OF APPRECIATION

THIS CERTIFICATE IS PRESENTED TO

*Dhanush Adithya S*

from **Mohamed sathak AJ college of engineering** for participating in a Two-Day Boot Camp for "Fusion 360 Design Challenge" under the aegis of "Naan Mudhalvan" programme, organized by the Department of Biomedical Engineering, SSNCE and AUTODESK Corporation on October 7th and 8th, 2022

**DR. J. VIJAY**  
CO-ORDINATOR

**DR. A. KAVITHA**  
CONVENER

*Handwritten signature in green ink*  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No 84, Rajahmundry Bypass Road,  
Sripada, IT Highway, Easttur,  
Chennai-600110

# Thank You

MOHAMMED KURSHITH ALI.M

From MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

**Volunteer - Student Member**

"In Appreciation For Your Engagement & Volunteering Towards SAE India Southern Section"

Felicitated on 16<sup>th</sup> Oct 2022, Chennai.



PRIN, 603103,  
Mohamed Sathak A.J. College of Engineering  
No.34, Raju Gandhi Salai (O.M.T)  
Sector - IT Highway Egattur  
Chennai - 603103.

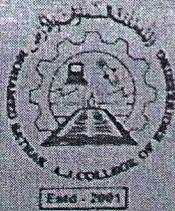


R A Armstrong  
Chairman - SAEISS



T Kasiraja  
Secretary - SAEISS





# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

Approved by AICTE, New Delhi, Affiliated to Anna University

34, Rajiv Gandhi Salai (OMR), SIPCOT IT Park, Shustee, Chennai - 603103



**TNEA**  
COUNSELLING CODE  
**1301**



Department of Mechanical Engineering, MSAJCE heartily congratulates final-year students  
**Mr. MOHAMMED KURSHITH ALI M & Mr. ABDULLAH B,**  
both have been awarded Best Student Coordinators for the AY 2022 by  
**SAEINDIA Collegiated Club, Southern Division**

*Handwritten signature*  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai  
Sipcot - IT Highway  
Chennai - 603103



044-2747 0024 | 99400 04500

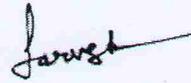
www.msajce-edu.in

**B.E./B.Tech./M.E.**

# Certificate of Training

**Dhanush Adithya S**

has successfully completed a 6-week online training on **SOLIDWORKS**. The training consisted of SolidWorks- Introduction, Interface and Sketching, Applying Features and Material, SolidWorks Assembly, SolidWorks Drawing and Portfolio Building, and Final Project- Air Piston-Cylinder Assembly modules. Dhanush scored 93% marks in the final assessment and is a top performer in the training. We wish Dhanush all the best for future endeavours.



Sarvesh Agarwal  
FOUNDER & CEO, INTERNSHALA

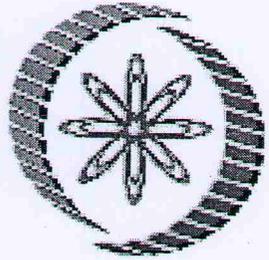


**PRINCIPAL**  
Mohemed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

Date of certification: 2022-10-18

Certificate no. : D7B39462-73BA-7373-B445-079BC5CA9DE2

For certificate authentication, please visit [https://trainings.internshala.com/verify\\_certificate](https://trainings.internshala.com/verify_certificate)



Elite

# NPTEL Online Certification

(Funded by the MoE, Govt. of India)



This certificate is awarded to

**SHAIK IRFAN K**

for successfully completing the course

## Advanced Machining Processes

with a consolidated score of **61** %

Online Assignments	19.79/25	Proctored Exam	40.88/75
--------------------	----------	----------------	----------

Total number of candidates certified in this course: 937

Aug-Oct 2022

(8 week course)

Prof. T. V. Bharat  
Head, Centre for Educational Technology  
NPTEL Coordinator, IIT Guwahati



Principal  
M. S. R. College of Engineering  
Sipahchala, Guwahati (Assam)  
Chennai - 600 075

Indian Institute of Technology Guwahati



Roll No: NPTEL22ME119534463665

To validate the certificate



No. of credits recommended: 2 or 3

INTERNSHALA TRAININGS

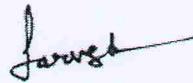
# Certificate of Training

**Dhanush Adithya S**

has successfully completed a 4-week online training on **Internship & Job Preparation**. The training consisted of Getting Started with the Job Hunt, Building up your Gears, Going at the Front, and The Final Project modules.

Dhanush scored 90% marks in the final assessment and is a top performer in the training.

We wish Dhanush all the best for future endeavours.



Sarvesh Agarwal

FOUNDER & CEO, INTERNSHALA



**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
SIPCOT - IT Highway Egattur,  
Chennai - 603103.

Date of certification: 2022-11-12

Certificate no. : 879F4100-EC9A-0721-148F-4617A52DF33A

For certificate authentication, please visit [https://trainings.internshala.com/verify\\_certificate](https://trainings.internshala.com/verify_certificate)

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

STUDENT CO - CURRICULAR PARTICIPATION / ACHEIVEMENTS DETAILS

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Academic Year : 2022-2023 (ODD)

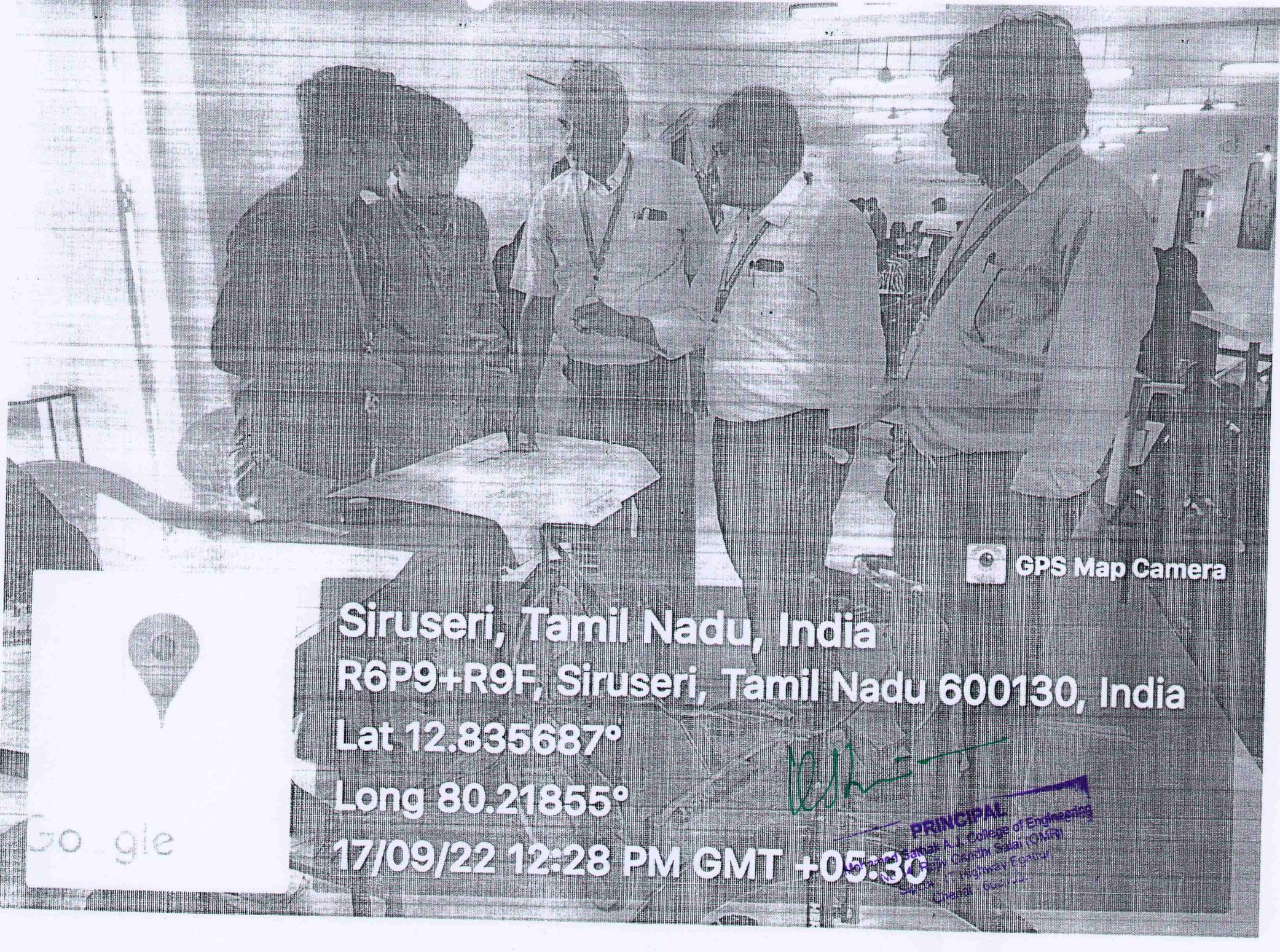
S.No	Name of the Students	Year/ Sem/Sec	Name of the Competition	Date	Organised by	Level	Name of the Event	Prizes Won	Remarks
1	Syed Akib Mohamed	IV/VII	Project EXPO'2022	17.09.2022	MSAJCE	I	Engineers Day	I	
2	K.Anish Kumar	II/III	Project EXPO'2022	17.09.2022	MSAJCE	I	Engineers Day	I	
3	Mohamed Thaheer	IV/VII	Project EXPO'2022	17.09.2022	MSAJCE	I	Engineers Day	II	
4	M.Mohamed Abdullah	IV/VII	Project EXPO'2022	17.09.2022	MSAJCE	I	Engineers Day	II	
5	Salman.S	IV/VII	Project EXPO'2022	17.09.2022	MSAJCE	I	Engineers Day	II	
6	Abinaya.K	III/VI	Project EXPO'2022	17.09.2022	MSAJCE	I	Engineers Day	I	
7	Abinaya.K	III/VI	Project Expo-2022	18.08.2022	SIMATS School of Engineering	I	National Level Project Expo 2022	First	
8	Abitha.B	III/VI	Project Expo-2022	18.08.2022	SIMATS School of Engineering	I	National Level Project Expo 2022	First	
9	Janani.E	III/VI	Project Expo-2022	18.08.2022	SIMATS School of Engineering	I	National Level Project Expo 2022	First	
10	Kamali.D	III/VI	Project Expo-2022	18.08.2022	SIMATS School of Engineering	I	National Level Project Expo 2022	Participated	
11	Madhivanan.R	III/VI	Project Expo-2022	18.08.2022	SIMATS School of Engineering	I	National Level Project Expo 2022	Participated	
12	Carol Persy.N	III/VI	Project Expo-2022	18.08.2022	SIMATS School of Engineering	I	National Level Project Expo 2022	Participated	
13	Kishore.S	III/VI	Project Expo-2022	18.08.2022	SIMATS School of Engineering	I	National Level Project Expo 2022	Participated	
14	Amudheeshwaran.S	III/VI	Project Expo-2022	18.08.2022	SIMATS School of Engineering	I	National Level Project Expo 2022	Participated	
15	Basharathulla.K	III/VI	Project Expo-2022	18.08.2022	SIMATS School of Engineering	I	National Level Project Expo 2022	Participated	
16	Abinaya.K	III/VI	Online course	29.09.2022	Microsoft	I	Microsoft Azure data fundamental	Participated	
17	Abinaya.K	III/VI	Online course	30.09.2022	Bentley Institute	I	2D/3D CAD Modeling of Building Deign	Participated	
18	Abitha.B	III/VI	Online course	28.09.2022	Microsoft	I	Microsoft platform fundamentals.	Participated	
19	Janani.E	III/VI	Online course	29.09.2022	Microsoft	I	Microsoft Azure data fundamental	Participated	
20	Janani.E	III/VI	Online course	30.09.2022	Bentley Institute	I	2D/3D CAD Modeling of Building Deign	Participated	
21	Janani.E	III/VI	Online course	30.09.2022	Mathworks	I	Machine learning onramp	Participated	
22	Sheik Abdullah	III/VI	Online course	04.11.2022	Sololearn	I	Theoretical Understanding of C	Participated	

Supporting Documents 1. Copy of Certificate

2. Photographs

Sign of the HoD with date

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.



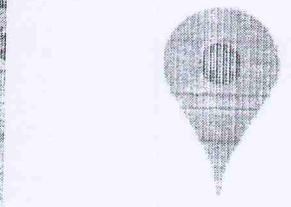
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R6P9+R9F, Siruseri, Tamil Nadu 600130, India

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Long 80.21855°

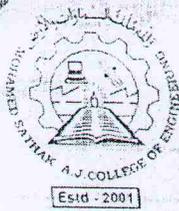
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**PRINCIPAL**  
J. Jayaraman  
Sri Ramakrishna Mission A.J. College of Engineering  
and Technology,  
Siruseri, Chennai-600130 (TN)  
Sri Ramakrishna Mission  
Highway Estate,  
Chennai-600005



# MOHAMED SATHAK A.J. COLLEGE OF ENGINEERING

SIPCOT IT Park, OMR, Siruseri, Chennai - 603103.



## Certificate of Appreciation Engineer's Day

This is to certify that Mr. / Ms. Syed AAKHIB MOHAMED of B.E / B. Tech  
IV year ECE department has won I prize in Project Expo'2022 competition  
conducted on 17<sup>th</sup> September 2022.

*Handwritten signature in green ink.*

*Handwritten signature in black ink.*  
Dr. J. Jeha  
Convener / HOD - EEE

*Handwritten signature in black ink.*  
Dr. K.S. Srinivasan  
Principal

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Raily Gandhi Salai (Old),  
SIPCOT - IT Highway Egattur,  
Chennai - 603103.





**MOHAMED SATHAK**  
**A.J. COLLEGE OF ENGINEERING**  
SIPCOT IT Park, OMR, Siruseri, Chennai - 603103.



*Certificate of Appreciation*  
*Engineer's Day*

This is to certify that Mr. / ~~Ms.~~ MOHAMMED TAHEER of B.E / B.Tech

IV year ECE department has won I prize in Project Expo competition

conducted on 17<sup>th</sup> September 2022.

  
**Dr. J. Jeha**  
Convener / HOD - EEE

  
**Dr. K.S. Srinivasan**  
Principal

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Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (GMR)  
Sipcot - IT Highway, Egattur,  
Chennai - 603103.





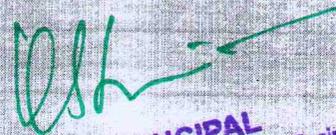
**MOHAMED SATHAK**  
**A.J. COLLEGE OF ENGINEERING**  
 SIPCOT IT Park, OMR, Siruseri, Chennai - 603103.



*Certificate of Appreciation*  
*Engineer's Day*

This is to certify that Mr./Ms. S. SALMAN of B.E / B. Tech  
IV year ECE department has won II prize in Project Expo'2022 competition  
 conducted on 17<sup>th</sup> September 2022.

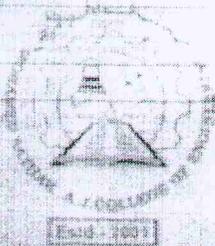
  
 Dr. J. Jeha  
 Convener / HOD - EEE



  
 Dr. K.S. Srinivasan  
 Principal

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**A.J. COLLEGE OF ENGINEERING**  
SIPCOT IT Park, OMR, Siruseri, Chennai - 603103.

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*Engineer's Day*

This is to certify that ~~Mr.~~ M. MOHAMED ABDULLAH

IV year ECE department has won II prize in Project Expo 2022

conducted on 17<sup>th</sup> September 2022

  
**Dr. J. Jeha**  
Convener / HOD - EEE

  
**Dr. K.S. Srinivasan**  
Principal

  
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Mohamed Sathak A.J. College of Engineering  
No. 34, Gandhi Salai (OMR)  
Siruseri, Chennai - 603103.



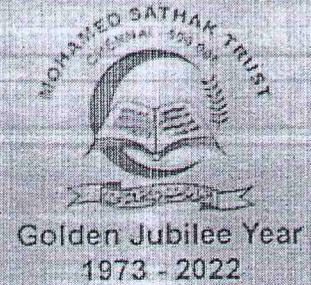
**CII**

2022-2024

2022-2024



**MOHAMED SATHAK**  
**A.J. COLLEGE OF ENGINEERING**  
SIPCOT IT Park, OMR, Siruseri, Chennai - 603103.



*Certificate of Appreciation*  
*Engineer's Day*

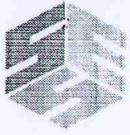
This is to certify that Mr. / ~~Ms.~~ K. Anish Kumar of B.E. / B. Tech  
(Overall)  
I year ECE department has won I prize in Project Expo 2022 competition  
conducted on 17<sup>th</sup> September 2022.

  
Dr. J. Jeha  
Convener / HOD - EEE

  
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Mohamed Sathak A.J. College of Engineering  
7th Rajiv Gandhi Salai (OMR)  
SIPCOT - IT Highway Egattur,  
Chennai - 603103.

  
Dr. K.S. Srinivasan  
Principal

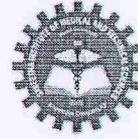




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**SAVEETHA**

INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES  
(Declared as Deemed to be University under Section 3 of UGC Act 1956  
Accredited with Grade 'A' by NAAC | 12B Status by UGC | Approved by AICTE



INSTITUTION'S  
INNOVATION  
COUNCIL  
(Ministry of HRD initiative)



**IEEE**



IEEE  
COMPUTER  
SOCIETY

# PROJECT EXPO

# 2022

*Organized by*

**Institute of CSE,**

**Department of Artificial Intelligence & Cloud Computing**



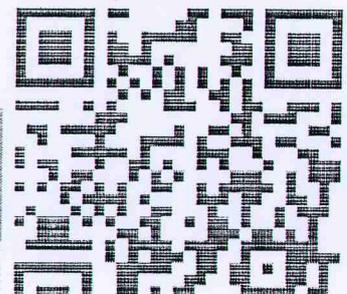
**PRINCIPAL**

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No.35 - Raju Gandhi Salai (Old)  
Spot - IT Highway Estate  
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**EXHIBIT YOUR INNOVATIVE IDEAS**

*Registration Link:*

<https://forms.gle/gDx8cYT8KxQhchWX8>

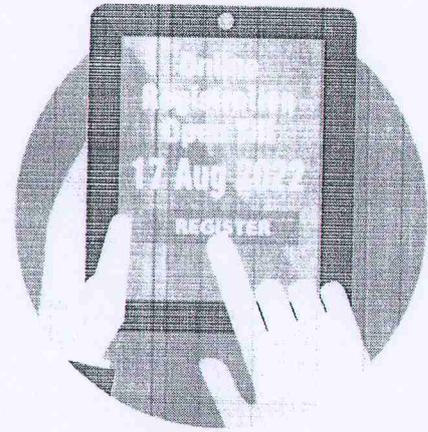


# Instructions to Participants

- 1 Interested students shall register through online using provides in the poster.
- 2 The registered participants are supposed to exhibit their innovative projects through online on 18th Aug 2022.
- 3 Students shall opt for individual or group presentation (not exceeding 4 participation in a team).
- 4 The time slots will be intimated to the participants one day before the day of presentation.
- 5 The online presentation will be judge by the industrial experts.
- 6 The details of the winners will be announced during the valedictory presentation.
- 7 The winners will be awarded with prizes and certificates.
- 8 All participants will receive the participation certificate.

**Who Can Attend?**

**Open to all  
UG and PG Students  
(SCOPE)**



## Organizing Committee

Chief Patron

**Dr. Ramya Deepak**

Head of School of Engineering

Patron

**Dr. B. Ramesh**

Head of Faculty of Science

Co - Patron

**Dr. Saravanan M. S**

**Dr. T. P. Anithaashri**

Organizing Chairs

**Dr. T. Veeramani**

**Dr. R. Balamanigandan**

**Dr. S. Saraswathi**

**Dr. C. Nelson Kennedy Babu**

**Dr. R. Mahaveeran**

**Dr. R. Surendaran**

**Dr. V. Chandrasekar**

**Dr. R. Bhavani**

**Dr. J. Chenni Kumarai**

**Dr. S. Selvakumar**

**Dr. P. Subramanian**

**Dr. B. Swaminathan**

**Dr. B. Rajakumar**

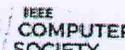
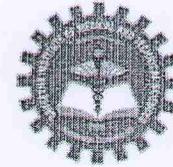
Committee Members

**E. Meganathan, M. Joypriyanka, S. Raveena, K. Vivek Balaji  
K. Sudhakar, N. Madhusundar, R. Yuvarani, A. Anto Sagaya Priscilla**



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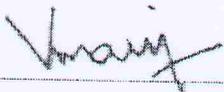
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## National Level Project Expo 2022

### CERTIFICATE

This is to certify that Mr./Ms. ABINAYA.K  
 of MOHAMED SATHAK A.J.COLLEGE OF  
 has won / participated on  
 the Title of NON-CONTACT THERMOMETER  
 contest. Place has been recognized for their outstanding  
 effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
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 Co-ordinator  
 Dr. T. Veeramani

  
 Head of the Department  
 Dr. Saravanan M.S

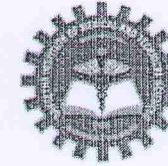
  
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of MOHAMED SATHAK A.J.COLLEGE OF has won / participated on  
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effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
Institute of CSE, SIMATS School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai.

  
Co-ordinator  
Dr. T. Veeramani

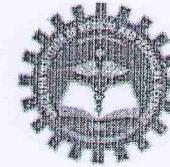
  
**PRINCIPAL**  
College of Engineering  
Institute of the Department  
of the Department  
Dr. Saravanan M.S.  
Mo. No. Sipu. Chennai - 600030.

  
Principal  
Dr. B. Ramesh



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 of MOHAMED SATHAK A.J.COLLEGE OF  
 has won / participated on  
 the Title of NON-CONTACT THERMOMETER contest. Place has been recognized for their outstanding  
 effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
 Institute of CSE, SIMATS School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai.

  
 Co-ordinator  
 Dr. T. Veeramani

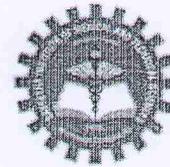
  
**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.  
 Head of the Department  
 Dr. Saravanan M.S.

  
 Principal  
 Dr. B. Ramesh



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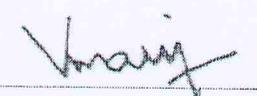
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 of MOHAMED SATHAK A.J.COLLEGE OF  
 has won / participated on  
 the Title of NON-CONTACT THERMOMETER contest. Place has been recognized for their outstanding  
 effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
 Institute of CSE, SIMATS School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai.

  
 Co-ordinator  
 Dr. T. Veeramani

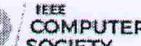
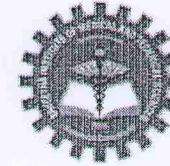
  
**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR)  
 Sippcot - IT Highway Egattur  
 Chennai - 603103.  
 Head of the Department  
 Dr. Saravanan M.S.

  
 Principal  
 Dr. B. Ramesh



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 of ..... **MOHAMED SATHAK A.J.COLLEGE OF** .....  
 has won / participated on  
 the title of ..... **PORTABLE HEALTHCARE SYSTEM** ..... contest ..... Place has been recognized for their outstanding  
 effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
 Institute of CSE, SIMATS School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai.

Co-ordinator  
Dr. T. Veeramani

**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
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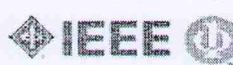
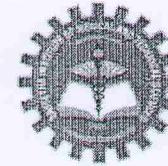
Head of the Department  
 Dr. Saravanan M.S

Principal  
Dr. B. Ramesh



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This is to certify that Mr. Ms. CAROL PÉRSY.N  
 of MOHAMED SATHAK A.J.COLLEGE OF  
ENGINEERING has won participated on  
 the Title of PORTABLE HEALTHCARE SYSTEM contest. 1<sup>st</sup> Place has been recognized for their outstanding  
 effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
 Institute of CSE, SIMATS School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai.

Co-ordinator  
Dr. T. Veeramani

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No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

Head of the Department  
Dr. Saravanan M.S

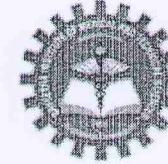
Principal  
Dr. B. Ramesh



ENGINEER TO EXCEL

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## National Level Project Expo 2022

### CERTIFICATE

KISHORE.S

This is to certify that Mr./Ms./.....  
 of.....  
 MOHAMED SATHAK A.J.COLLEGE OF  
 has won participated on  
 the Title of.....  
 PORTABLE HEALTHCARE SYSTEM  
 contest..... Place has been recognized for their outstanding  
 effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
 Institute of CSE, SIMATS School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai.

Co-ordinator  
Dr. T. Veeramani

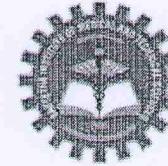
**PRINCIPAL**  
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 No.34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.  
 Head of the Department  
 Dr. Saravanan M.S

Principal  
Dr. B. Ramesh



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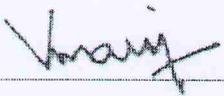
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of ..... **MOHAMED SATHAK A.J.COLLEGE OF** .....  
has won / participated on  
the title of ..... **PORTABLE HEALTHCARE SYSTEM** ..... contest ..... Place has been recognized for their outstanding  
effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
Institute of CSE, SIMATS School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai.

  
Co-ordinator  
**Dr. T. Veeramani**

  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

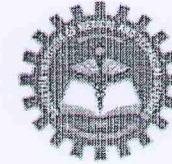
  
Head of the Department  
**Dr. Saravanan M.S**

  
Principal  
**Dr. B. Ramesh**



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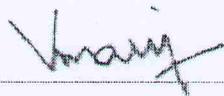
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## National Level Project Expo 2022

### CERTIFICATE

This is to certify that Mr./Ms. BASHARATHULLA K  
 of MOHAMED SATHAK A.J. COLLEGE OF has won / participated on  
 the Title of SMART HOME contest. Place has been recognized for their outstanding  
 effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
 Institute of CSE, SIMATS School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai.

  
 Co-ordinator  
 Dr. T. Veeramani

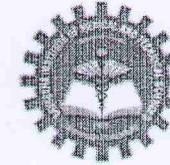
  
**PRINCIPAL**  
 Mohamed Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
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 Head of the Department  
 Dr. Saravanan M.S.

  
 Principal  
 Dr. B. Ramesh



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## National Level Project Expo 2022

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 of MOHAMED SATHAK A.J. COLLEGE OF has won / participated on  
 the Title of SMART HOME contest. Place has been recognized for their outstanding  
 effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
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*V. Veeramani*

Co-ordinator  
Dr. T. Veeramani

*M.S. Saravanan*

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No. 34, Rajiv Gandhi Salai (OMR)  
SIPCOT - IT Highway Egattur,  
Chennai - 603103.

*M.S. Saravanan*

Head of the Department  
Dr. Saravanan M.S

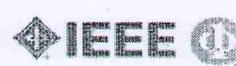
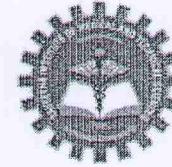
*B. Ramesh*

Principal  
Dr. B. Ramesh



# SIMATS SCHOOL OF ENGINEERING

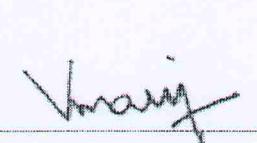
Approved By AICTE | IET-UK Accreditation



## National Level Project Expo 2022

### CERTIFICATE

This is to certify that Mr./Ms./ SAFRIN S  
of MOHAMED SATHAK A.J. COLLEGE OF has won / participated on  
the Title of SMART HOME contest..... Place has been recognized for their outstanding  
effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
Institute of CSE, SIMATS School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai.

  
Co-ordinator  
Dr. T. Veeramani

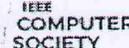
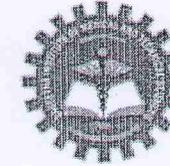
  
**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.  
Head of the Department  
Dr. Saravanan M.S

  
Principal  
Dr. B. Ramesh



# SIMATS SCHOOL OF ENGINEERING

Approved By AICTE | IET-UK Accreditation

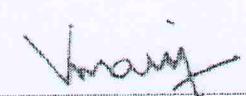


## National Level Project Expo 2022

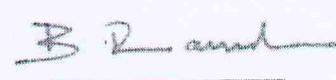
### CERTIFICATE

GIRISH R

This is to certify that Mr./Ms./ .....  
of .....  
the title of .....  
effort in the "National Level Project Expo 2022" on 18<sup>th</sup> August 2022. Organized by the Department of Artificial Intelligence,  
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Principal  
Dr. B. Ramesh



सी डैक  
CDAC

GOV

Maker  
Village



Ministry of Electronics and Information Technology  
Government of India

# स्व शी MICROPROCESSOR CHALLENGE

## CERTIFICATE OF PARTICIPATION

THIS CERTIFICATE IS AWARDED TO

**MS. BHEULAH G.L.**

for participating as a Semi Finalist under 'Swadeshi  
Microprocessor Challenge 2020'

Smt. Sunita Verma,  
Sr. Director, MeitY

**PRINCIPAL**  
Mohamed Sathak A.J. College of Engineering  
No.34, Rajiv Gandhi Salai (OMR)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

Issued on: 23/09/2021  
Issued by: MeitY



**MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103**  
**STUDENT EXTRA - CURRICULAR PARTICIPATION / ACHEIVEMENTS DETAILS**  
**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

Academic Year 2022-2023(EVEN)								
S.No	Name of the Students	Year/ Sem/Sec	Name of the Competition	Date	Organised by	Level	Name of the Event	Prizes Won
1	K.Nandhini	II/IV	PICTIONARY	14-03-2023	MSAJCE	Participation	INTERCOLLEGE CULTURAL MEET-FESTAVERSE(Habibi 2023)	
2	Humaira Nusrath	II/IV	PICTIONARY	14.02.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FESTAVERSE(Habibi 2023)	II
3	Humaira Nusrath	II/IV	RUBICS CUBE	14.02.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FESTAVERSE(Habibi 2023)	I
4	S.Chitra	II/IV	DANCE	15.02.2023	MSAJCE	Participation	INTERCOLLEGE CULTURAL MEET-FESTAVERSE(Habibi 2023)	
5	K.Suhail	II/IV	DANCE	15.02.2023	MSAJCE	Participation	INTERCOLLEGE CULTURAL MEET-FESTAVERSE(Habibi 2023)	
Academic Year 2022-2023(ODD)								
S.No	Name of the Students	Year/ Sem/Sec	Name of the Competition	Date	Organised by	Level	Name of the Event	Prizes Won
1	B.Subash	III/IV	AZAP	01.06.2022	INM Jain Engineering Colleg	Final	COGNIT ' 22	II
2	B.Subash	III/IV	DUMB Charades	01.06.2022	INM Jain Engineering Colleg	Final	COGNIT ' 23	I
3	S.Chitra	II/IV	RANGOLI	17.09.2023	MSAJCE		ENGINEER'S DAY	I

Supporting Documents Required 1. Copy of Certificate

2. Photographs

Format No : TLP 37

Rev.No : 1.0

*B. Manjini*  
 Sign of the HoD with date  
 Rev. Date : 04.01.23

*[Signature]*

**PRINCIPAL**  
 Sathak A.J. College of Engineering  
 No.34, Rajiv Gandhi Salai (OMR)  
 Sipcot - IT Highway Egattur,  
 Chennai - 603103.



*Wsh*  
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Sipcot - IT Highway Egattur,  
Chennai - 603103.



*Alh*

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Mohamed Sathak A. J. College of Engineering  
No.34, Rajiv Gandhi Salai (O.M.R.)  
Sipcot - IT Highway Egattur,  
Chennai - 603103.

MOHAMED SATHAK A J COLLEGE OF ENGINEERING, Chennai - 603103

STUDENT SPORTS PARTICIPATION / ACHIEVEMENTS  
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING  
Academic Year 2022-2023(EVEN)

S.No	Name of the Student	Year/ Sem/Sec	Name of the Event	Individual / Team	Date	Organised by	Level*	Venue	Prizes Won	Remarks
1	Mohamed Yahya.N.I	II/IV	WEIGHT LIFTING	Individual	27.02.2023	MSAJCE	Participation	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)		
2	H.Bhavani	II/IV	Throw Ball	Team	24.02.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	I	
3	S.Chitra	II/IV	Throw Ball	Team	24.02.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	I	
4	Kamali.D	III/VI	Throw Ball	Team	24.02.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	II	
5	Majithul Hikkum	II/IV	Volley Ball	Team	16.02.2023	MSAJCE	Participation	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)		
6	Afal Ahamed	III/VI	Volley Ball	Team	16.02.2023	MSAJCE	Participation	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)		
7	S.Chitra	II/IV	KHO-KHO	Team	23.02.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	II	
8	Kamali.D	III/VI	KHO-KHO	Team	23.02.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	I	
9	Carol Persy.N	III/VI	KHO-KHO	Team	23.02.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	I	
10	S.Chitra	II/IV	4X100 RELAY	Team	01.03.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	I	
11	Poo Sathish Kumar	III/VI	4X100 RELAY	Team	01.03.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	II	
12	Poo Sathish Kumar	III/VI	200MTS	Individual	01.03.2023	MSAJCE	Final	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	I	
14	Sowndhary.G	II/IV	TENNICOIT SINGLES	Team	03.03.2023	MSAJCE	WINNER	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	I	
15	Sowndhary.G	II/IV	CHO-CHO	Team	23.02.2023	MSAJCE	WINNER	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	I	
16	Sowndhary.G	II/IV	CHESS	Team	27.02.2023	MSAJCE	RUNNER	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	II	
17	Sowndhary.G	II/IV	JAVELIN	Team	28.02.2023	MSAJCE	THIRD	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	III	
18	Sowndhary.G	II/IV	Throw Ball	Team	24.02.2023	MSAJCE	RUNNER	INTERCOLLEGE CULTURAL MEET-FEST(AVERSE)(Habibi 2023)	II	
Academic Year 2022-2023(ODD)										
S.No	Name of the Student	Year/ Sem/Sec	Name of the Event	Individual / Team	Date	Organised by	Level*	Venue	Prizes Won	Remarks
1	Akmal	III/V	Foot Ball	Team	16.10.2022	Reliance Foundation	Q.Final	Nehru Stadium		
2	Akmal	III/V	Foot Ball	Team	16.09.2022	MSAJCE	Final	MSAJCE	I	

Supporting Documents Required 1. Copy of Certificate

Physical Director

Format No : TLF 39

2. Principal  
**PRINCIPAL**  
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 Sipcot - IT Highway Egattur,  
 Chennai - 603103.

Sign of the HoD with date

Rev. Date : 04.01.21

Level\* : State / Nat / Int.Nat