17/01/25

JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			**END SEM EXAMINATION** **School of Engineering & IT**
Branch	**ME / Mechatronics**	**Program**	**Diploma**
Subject Name	**Mathematics-I**	**Semester**	**I**
		Year	**January, 2025**
Time: 3 Hour Max. Marks : 70	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any Four out of Six of Section B** • **Answer Any Three out of Five of Section C** • **Possession of Mobile Phone** or any kind of **Written Material, Arguments with the Invigilator or Discussion with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Paper(s)**.		
Knowledge Level (KL)	**K1** : Remembering	**K3** : Applying	**K5** : Evaluating
	K2 : Understanding	**K4** : Analysing	**K6** : Creating

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	Find the value of $sin\,3\,30° + cos\,1\,20°$.	2	CO5	K1
ii	If Sin A = 3/4, calculate cos A and tan A.	2	CO1	K6
iii	How many 4-digit numbers can be formed by using the digits 1 to 9 if repetition of digits is not allowed?	2	CO4	K4
iv	If $z = 2 - 3i$, find $\bar{z}$.	2	CO1	K4
v	If $z = 2 - 3i$, find $z\bar{z}$ =?	2	CO6	K2
vi	If $A = (1,2)$, $B = (3,5)$ and $C = (6,7)$, find $\underset{AB}{\rightarrow}$ and $\underset{CB}{\rightarrow}$.	2	CO3	K3
vii	Find the value of $sin\,3\,5°$	2	CO3	K5
viii	Evaluate 7 !	2	CO4	K4
ix	If 4x + i(3x – y) = 3 + i (– 6), where x and y are real numbers, then find the values of x and y.	2	CO3	K3
x	Find the number of permutations of the letters of the word ALLAHABAD.	2	CO3	K2

1 SET XEROX

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Express $(5-3i)^3$ in the form a + ib	05	CO4	K4
3	Find the slope of the lines: (a) Passing through the points (3, – 2) and (–1, 4), (b) Passing through the points (3, – 2) and (7, – 2), (c) Passing through the points (3, – 2) and (3, 4)	05	CO3	K6
4	Five digits are given 1,2,3,4,5. How many three digits number are possible if repetition is not allowed?	05	CO1	K3
5	If the angle between two vectors $\vec{a} = \hat{\imath} - 2\hat{\jmath} + 3\hat{k}$ and $\vec{b} = 3\hat{\imath} - 2\hat{\jmath} + \hat{k}$ is 60^8, find their dot product .	05	CO4	K1
6	Find the equation of the line passing through the points (–2, 6) and (4, 8).	05	CO3	K3
7	Determine the multiplicative inverse of 4 – 3i.	05	CO6	K2

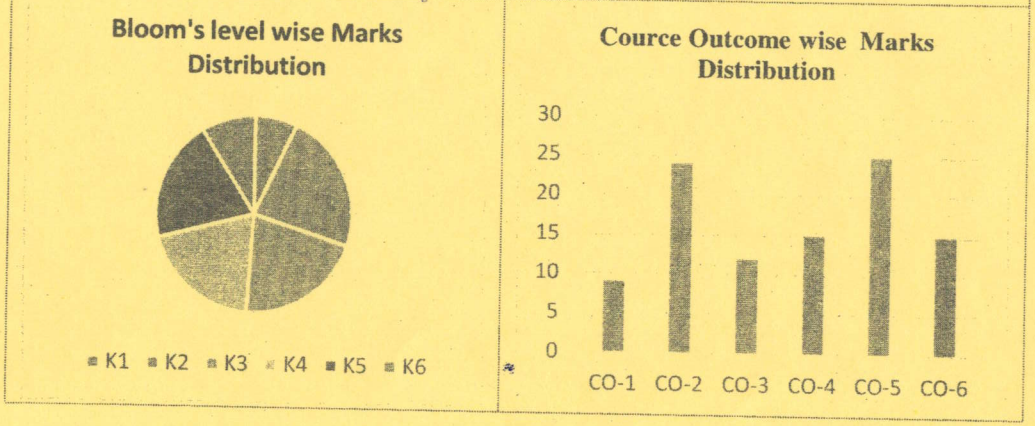
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	How many 3-digit numbers can be formed from the digits 1, 2, 3, 4 and 5 assuming that (i) Repetition of the digits is allowed? (ii) Repetition of the digits is not allowed?	10	CO4	K5
9	Find the values of other all other trigonometric functions if cot x = ¾, x lies in the third quadrant.	10	CO3	K3
10	What is the angle between two vectors a and b with magnitude $\sqrt{3}$ and 4, respectively and $\vec{a}.\vec{b} = 2\sqrt{3}$.	10	CO4	K4
11	Find the sum of the vectors $\vec{a} = 2\hat{\imath} + 3\hat{\jmath} - 9\hat{k}$ and $\vec{b} = 3\hat{\imath} + 0\hat{\jmath} - 2\hat{k}$ .Also find the magnitude of $\vec{a} + \vec{b}$.	10	CO3	K6
12	How many numbers lying between 100 and 1000 can be formed with the digits 0, 1, 2, 3, 4, 5, if the repetition of the digits is not allowed?	10	CO1	K1

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Apply the concept of trigonometric ratios angles in different field of engineering
	CO2	can remember the concept of vectors and use of vectors in mathematics.
	CO3	Understand, predict and optimize engineering systems.
	CO4	Analyzing about different forms of the equation of straight line and curves
	CO5	Analyze vectors in geometrically and algebraically.
	CO6	Evaluating why mathematical thinking is valuable in daily life

GRAPHICAL REPRESENTATION



20/01/25

ARKA JAIN University, Jharkhand — NAAC GRADE A		END SEM EXAMINATION School of Engineering & IT	
Branch	ME / Mechatronics	Program	Diploma
Subject Name	Applied Chemistry	Semester	I
		Year	January, 2025
Time: 3 Hour Max. Marks : 70	• Start writing from 2nd page onwards; don't Write on the 1st Page Backside • Answer all Questions of Section A (Compulsory) • Answer Any Four out of Six of Section B • Answer Any Three out of Five of Section C • Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Paper(s).		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

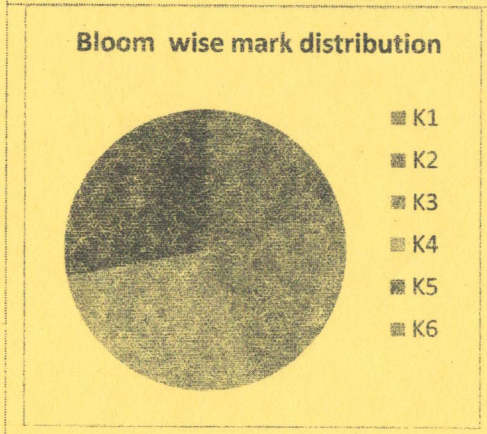
Q. N 1	QUESTIONS	Marks	COs	KL
i	Distinguish between scale and sludge.	2	CO5	K2
ii	Difference between electrolysis and electrolytes.	2	CO2	K3
iii	Write the properties of Lubricants.	2	CO4	K3
iv	Give the two ore names for Aluminium and Iron.	2	CO2	K2
v	Distinguish between the ferrous and non-ferrous alloy.	2	CO1	K3
vi	What do you understand by waterline corrosion?	2	CO1	K1
vii	Define copolymer and polymer with example.	2	CO4	K1
viii	Which of the following orbital are not possible? 2d, 1p, 3s, 4p	2	CO3	K2
ix	Discuss the degree of hardness in terms of CaCo3.	2	CO3	K4
x	Define covalent bond with the help of proper example.	2	CO5	K5

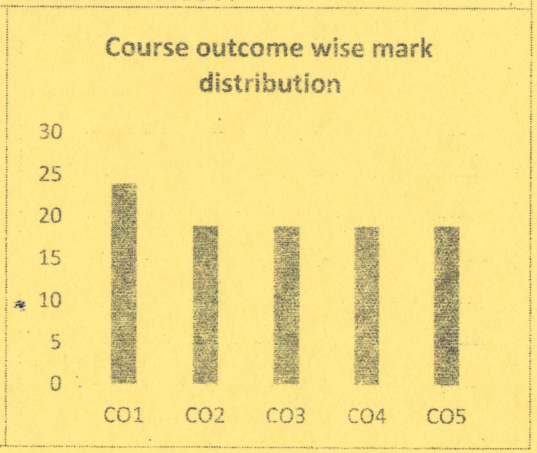
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
2	Explain the principal and magnetic quantum numbers.	05	CO3	K5
3	Which ion causes alkalinity? Write the procedure of alkalinity.	05	CO4	K3
4	Why corrosion is natural process? Discuss about electrochemical corrosion.	05	CO5	K2
5	Explain the method of extraction of ore from hematite ore using blast furnaces.	05	CO4	K5
6	Explain Bohr atomic model. Give its postulates and limitation.	05	CO1	K4
7	Define calorific value of fuel. Mention the characteristics of good fuel.	05	CO2	K4
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)				
Q. No.	QUESTIONS	Marks	COs	KL
8	State Faraday's first law of electrolysis and derive the mathematical relation. Discuss about the Electroplating used in the industrial application of electrolysis.	10	CO3	K4
9	What is the principle of EDTA method? Describe the estimation of hardness of water by complexometric titration.	10	CO4	K4
10	a) Explain filling of electrons in different orbitals by Aufbau's (n+l) rule. b) Write the electronic configuration of N(7), Na(11), Fe(26) and C(6).	10	CO1	K1
11	Write short notes on a) Leaching process for aluminium b) Bakelite c) Polystyrene	10	CO2	K5
12	a) Discuss the proximate analysis of coal? b) Write the composition and uses of biogas and CNG gas.	10	CO5	K5

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Classify matter based on state of aggregation and substantiate the laws and principles on which structure of atom is established.
	CO2	Explain cause and facture factors which adversely affecting natural water quality and remedial measure available for water purification to achieve water quality standards.
	CO3	Qualitatively analyze the engineering materials and understand their properties and applications and explain the chemistry of various polymers.
	CO4	Ascertain construction, mechanism efficiency of electrochemical cells and understand corrosion and develop economical prevention techniques.
	CO5	Select most efficient fuel and lubricant for engine and engineering applications in relevant applications.

GRAPHICAL REPRESENTATION





22/01/25

ARKA JAIN University, Jharkhand — NAAC GRADE A, ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Branch	ME / Mechatronics	Program	Diploma
Subject Name	Applied Physics	Semester	I
		Year	January, 2025
Time: 3 Hour Max. Marks : 70	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any Four out of Six of Section B** • **Answer Any Three out of Five of Section C** • **Possession of Mobile Phone** or any kind of **Written Material, Arguments with the Invigilator or Discussion with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Paper(s)**.		

Knowledge Level (KL)			
	K1 : Remembering	**K3** : Applying	**K5** : Evaluating
	K2 : Understanding	**K4** : Analysing	**K6** : Creating

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

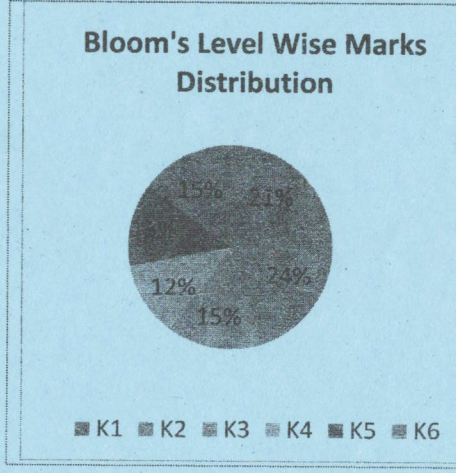
Q. N 1	QUESTIONS	Marks	COs	KL
i	Differentiate between fundamental and derived unit.	2	CO2	K2
ii	Specify Triangle law of vector addition?	2	CO2	K3
iii	State power. Give it S.I unit and dimensions?	2	CO1	K4
iv	Define the terms energy, potential energy and kinetic energy?	2	CO6	K2
v	What is the effect of temperature on surface tension?	2	CO2	K1
vi	Compute different types of stress?	2	CO2	K3
vii	Classify laws of thermodynamics?	2	CO3	K2
viii	Illustrate specific heats and molar specific heats?	2	CO3	K2
ix	Give two applications of Total Internal Reflection?	2	CO5	K3
x	Write advantages and dis-advantages of Nano-Technology?	2	CO5	K1

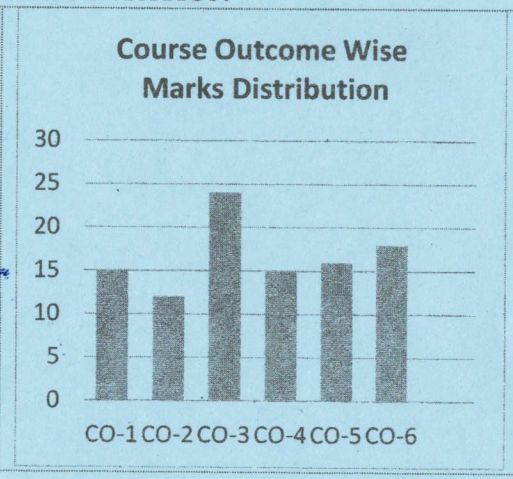
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)				
Q. No.	**QUESTIONS**	**Marks**	**COs**	**KL**
2	Derive equations of motion in a straight line?	05	CO4	K5
3	A man weighing 50 kg carries a load of 10 kg on his head. Find the work done when he goes (i) 15 m vertically up (ii) 15 m on a levelled path on the ground. OR Two forces of 4 N and 5 N are acting at a point such that the angle between them is 60 degrees. Find the resultant force and direction of Resultant force.	05	CO3	K6
4	Show that total mechanical energy of freely falling body at all the positions is conserved?	05	CO1	K3
5	Explain different kind of modulus of elasticity?	05	CO2	K3
6	State and Explain Boyles law, Charles laws?	05	CO4	K1
7	Discuss Conditions necessary for total internal reflection.	05	CO5	K2
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)				
Q. No.	**QUESTIONS**	**Marks**	**COs**	**KL**
8	State and explain parallelogram law of vector addition.	10	CO4	K5
9	A ball is thrown vertically upwards with a velocity of 20 m s–1 from the top of a multi-storey building. The height of the point from where the ball is thrown is 25.0 m from the ground. (a) How high will the ball rise? And (b) how long will it be before the ball hits the ground? Take g = 10 m s–2	10	CO1	K3
10	Derive Formula for surface tension based on capillary rise method?	10	CO6	K6
11	Discuss volume coefficient of a gas and pressure coefficient of a gas?	10	CO3	K4
12	Explain principle and working optical fibres?	10	C04	K5

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Define scientific work, energy and power and their units.
	CO2	Represent physical quantities as scalar and vectors and solve real life relevant problems.
	CO3	Identify physical quantities, select their units for use in engineering solutions, and make measurements with accuracy by minimizing different types of errors.
	CO4	Analyse type of motions and apply the formulation to understand banking of roads/railway tracks and conservation of momentum principle to describe rocket propulsion, recoil of gun etc.
	CO5	Describe forms of friction and methods to minimize friction between different surfaces.
	CO6	Drive relationships for work, energy and power and solve related problems.

GRAPHICAL REPRESENTATION





JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			**END SEM EXAMINATION** **School of Engineering & IT**
Branch	**ME / Mechatronics**	**Program**	**Diploma**
Subject Name	**Communication Skills in English**	**Semester**	**I**
		Year	**January, 2025**
Time: 3 Hour Max. Marks : 70	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any Four out of Six of Section B** • **Answer Any Three out of Five of Section C** • **Possession of Mobile Phone** or any kind of **Written Material, Arguments with the Invigilator or Discussion with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Paper(s)**.		
Knowledge Level (KL)	**K1 :** Remembering	**K3 :** Applying	**K5 :** Evaluating
	K2 : Understanding	**K4 :** Analysing	**K6 :** Creating

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	What are the other three names of Soft Skill?	2	Co1	KL1
ii	Who is known as the receiver in the process of Communication?	2	Co2	KL3
iii	Name the different types of Psychological nature of an individual.	2	Co2	KL2
iv	Write down the meaning of the proverb: "Action speaks louder than words". And use it in a sentence.	2	Co3	KL1
v	Define Antonyms and Synonyms with one example.	2	Co4	KL4
vi	Name the two Professors who coined the term 7cs of Communication.	2	Co3	KL3
vii	State any two points why self-awareness is important for students.	2	Co2	KL2
viii	Define Soft Skill.	2	Co5	KL2
ix	Name the 3 p's of Speaking Skills.	2	Co5	KL1
x	Name the author of the poem "The Night of The Scorpion".	2	Co4	KL2

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Differentiate between Empathy and Sympathy.	05	Co5	KL6
3	State down the importance of Soft Skills.	05	Co4	KL3
4	Describe why Self- awareness is important for students.	05	Co2	KL2
5	Elaborate the meaning of the (Administrative terms): Ideal, Illegal, Identity, Corruption, Regime.	05	Co3	KL6
6	Write the summary of the short story "Room on the Roof" by Ruskin Bond.	05	Co2	KL3
7	List down 5 importance of Communication.	05	Co5	KL2

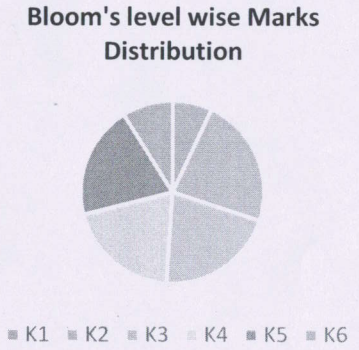
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

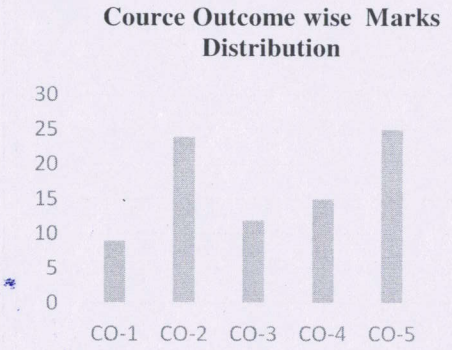
Q. No.	QUESTIONS	Marks	COs	KL
8	Write an essay on the topic "Practice makes a man Perfect".	10	Co3	KL3
9	Explain how one can adapt Adaptability Skills.	10	Co3	KL3
10	Illustrate why 'Art of choosing time is important'.	10	Co3	KL4
11	Narrate a short story on "Adventure".	10	Co3	KL6
12	Write a letter to your friend and motivate him to do better in exams.	10	Co3	KL5

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Develop basic speaking and writing skills including proper usage of language and vocabulary so that they become highly confident and skilled speakers and writers.
	CO2	Be informed of the latest trends in basic verbal activities such as presentations, facing interviews and other forms of oral Communication.
	CO3	Also develop skill of group presentation and communication in team. Develop non-verbal communication such as proper use of body language and gestures.
	CO4	Learn the Reading Comprehension.
	CO5	Learn Grammar and Vocabulary.

GRAPHICAL REPRESENTATION





28/01/25

JGI ARKA JAIN University Jharkhand — NAAC GRADE A ACCREDITED UNIVERSITY			END SEM EXAMINATION School of Engineering & IT
Branch	ME / Mechatronics	Program	Diploma
Subject Name	Sports and Yoga Or NSS/NCC	Semester	I
		Year	January, 2025
Time: 1.5 Hour Max. Marks : 35	• Start writing from 2nd page onwards; **don't Write on the 1st Page Backside** • **Answer all Questions of Section A (Compulsory)** • **Answer Any Five out of Six of Section B** • **Answer Any Two out of Four of Section C** • **Possession of Mobile Phones** or any kind of **Written Material, Arguments with the Invigilator or Discussing with Co-Student** will comes under **Unfair Means** and will **Result** in the **Cancellation of the Papers.**		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

Section A (Each question Carry 01 Marks from Q1-i to v) – 05 Marks

Q. N 1	QUESTIONS	Marks	COs	KL
i	What is the primary objective of the National Cadet Corps (NCC)?	01	CO4	K1
ii	How does the National Cadet Corps contribute to the personal development of youth in India?	01	CO5	K3
iii	How many players are there in a cricket team?	01	CO2	K4
iv	How many players from each team are allowed to be on the field at the start of a cricket match?	01	CO1	K3
v	How does the number of players on the field vary between formats in cricket (Test, ODI, T20)?	01	CO3	K2

Section B (Answer any FIVE out of SIX) – 10 Marks
(Each question Carry 02 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	What are the primary benefits of practicing yoga regularly?	02	CO4	K1
3	How can yoga be incorporated into a daily routine to improve mental and physical health?	02	CO2	K3
4	What are the key benefits of participating in sports for physical and mental health?	02	CO3	K5
5	How does NCC help cadets in their career development and employability?	02	CO1	K2

6	How is a winner determined in a marathon?	02	CO2	K5
7	What are the eligibility criteria for joining the National Cadet Corps?	02	CO4	K4

Section C (Answer any TWO out of FOUR) – 20Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	How does yoga differ from other forms of exercise in terms of its impact on flexibility, strength, and stress relief?	10	CO2	K1
9	What extent has the NCC been successful in contributing to the overall development of youth in India, both in terms of personal growth and national service?	10	CO1	K5
10	How does the NCC contribute to social service and community development, and what are some key activities undertaken by cadets in this area?	10	CO5	K4
11	What is the National Service Scheme (NSS), and how does it promote social welfare and volunteerism among students?	10	CO3	K1

CO- Course Outcomes, **KL**- Knowledge Level, **PO** – Program Outcome

Course Outcomes	CO1	Train volunteer youth to become confident, committed and competent leaders in all walks of life.
	CO2	Enhance awareness levels of cadets to become empowered and responsible citizens of the country.
	CO3	Undertake adventure activities to hone leadership qualities and risk taking abilities.
	CO4	Provide a platform to launch 'Good Will Ambassadors' to project the image of the country overseas.
	CO5	Provide opportunities and encourage cadets to enrich their knowledge, develop communication skills and build character.

GRAPHICAL REPRESENTATION