

# Hindustan College of Science and Technology

Farah (Mathura)

## Department of Information Technology

Date: 22Jan 2019

### Circular

#### Registration for Value-Added Course: "Problem Solving using C and C++ (VACIT-001)"

Dear students,

We are pleased to announce a value-added course on "Problem Solving using C and C++" scheduled to take place from 06 February 2019 to 16 April 2019 for 2<sup>nd</sup> year students. This course aims to equip you with essential problem-solving skills using the C and C++ programming languages, which are fundamental to your academic and professional growth in the field of Information Technology.

#### Course Details:

Course Name: Problem Solving using C and C++

Course Duration: 06 February 2019 to 16 April 2019 (30 Hrs)

Last Date of Registration: 02 February 2019

#### Registration:

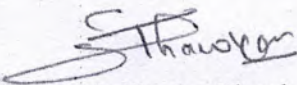
To participate in this valuable opportunity, interested students must register themselves by 2nd February 2019. To register, kindly contact Mr. Ajay Raj Parashar, Assistant Professor in the Department of Information Technology. Mr. Parashar will guide you through the registration process and address any queries you may have.

Please note that this course is mandatory for all the students of 2<sup>nd</sup> year IT Department. As, this value-added course presents a unique opportunity for you to enhance your programming skills and stand out in the highly competitive IT industry.

For any further information or clarification, please feel free to contact the undersigned.

Thank you.

Sincerely,



Mr. Shankar Thawkar  
HOD, IT

Head  
Department of Information Technology  
Hindustan College of Science & Technology  
Farah, Mathura

Copy to:

1. Director office for kind information
2. All Deans
3. All HODs – for circulation among all concerned
4. Office Copy



Director

Hindustan College of  
Science & Technology  
FARAH (MATHURA)

#### VISION OF THE DEPARTMENT

Information Technology undergraduate program empowers students with research and training-based education to become global technical leaders and entrepreneurs, creating positive societal impact.

#### MISSION OF THE DEPARTMENT

- Foster innovation, research, and entrepreneurship through real-world projects and industry collaborations.
- Develop ethical global leaders with theoretical and practical education, critical thinking, and social responsibility.
- Provide outcome-based education for holistic development, integrating technical skills with leadership and teamwork.

**HINDUSTAN COLLEGE OF SCIENCE AND TECHNOLOGY  
MATHURA**

INVITES YOU FOR A  
**VALUE ADDED COURSE**  
ON

**PROBLEM SOLVING USING C AND C++  
(VACIT-001)**

**06<sup>th</sup> Feb 2019 - 16<sup>th</sup> April 2019**

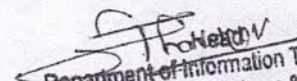
(Session: 2018 - 2019)

Registration Date: 28 Jan 2019 - 02 Feb 2019

For Registration, Please contact:

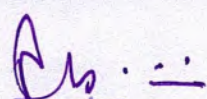
Mr. Ajay Raj Parashar

Assistant Professor, IT

  
Department of Information Technology  
Hindustan College of Science & Technology  
Farah, Mathura

**DEPARTMENT OF INFORMATION TECHNOLOGY**

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# ABOUT

## THE DEPARTMENT

Department of Information Technology was established in the year 1999 with an objective of imparting quality education in the field of Information Technology. Department of IT was accredited by National board of Accreditation (NBA) in 2006.

The department is located in a sprawling environment with a highly qualified and experienced faculty. The department works with the objective of addressing critical challenges faced by the industry, society and the academia. Perhaps even more important is our unceasing commitment to our students, helping them to learn, grow, develop, and achieve their goals in their pursuit to excel in their professional career.

The department also have a student association QUBIT that provides a platform to future engineers to learn new technological innovations and also provide industry exposure to the students, by organizing workshops, seminars & other events.

# ABOUT

## THE PROGRAM

This program is designed to provide a comprehensive overview of C/C++ programming. The syllabus covers a range of topics including functions, arrays and pointers, secure coding practices, exception handling and assertions, disk files and I/O, and generic programming with templates. Through practical exercises and problem sets, students will develop the skills to write efficient and secure code in C/C++. The course also covers the dynamic memory allocation model and the use of smart pointers to mitigate common memory pitfalls. In addition, students will have the opportunity to work with the Standard Template Library and understand its various components such as containers, iterators, and algorithms. This program provides a comprehensive learning experience for anyone looking to enhance their C/C++ programming skills. By the end of the program, students will be well-equipped to tackle complex coding projects and have a deep understanding of how to write efficient and secure code in C/C++.

### Objectives

1. To provide a comprehensive overview of C/C++ programming and its various components.
2. To equip students with the skills to write efficient and secure code through the use of functions, arrays and pointers, and secure coding practices.
3. To teach students how to handle errors and exceptions in their code, and implement proper error handling and assertions.
4. To introduce students to the dynamic memory allocation model, including smart pointers and common memory pitfalls.
5. To help students understand and utilize the Standard Template Library and its various components, including containers, iterators, algorithms, and customizing and extending the STL. Allowing them to perform real-world data analysis and extract insights.

# COURSE

## OUTCOMES

### CO-1:

Understand functions and write efficient, secure code in C/C++.

### CO-2:

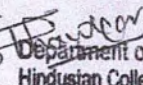
Analyze and use arrays, pointers, dynamic memory allocation, and type inference.

### CO-3:

Identify and prevent common string and integer errors using secure coding practices.

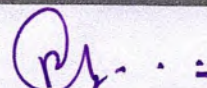
### CO-4:

Implement error handling, assertions, exceptions, stack unwinding, disk files, I/O streams, and the standard template library (STL), including customization and extension

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Hindustan College of Science & Technology  
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# CO-PO-PSO MAPPING

## Problem Solving using C and C++ (VACIT-001)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	3	2	2	-	3	-	3	2	-	-	2	2	3	-
CO-2	2	3	3	3	-	1	-	2	2	-	-	2	3	3	-
CO-3	1	2	-	2	1	1	-	-	2	-	-	2	3	2	-
CO-4	3	2	2	3	3	3	-	3	2	-	2	2	3	3	-
Avg	2.25	2.50	2.33	2.50	2.00	2.00	0.00	2.67	2.00	0.00	2.00	2.00	2.75	2.75	0.00

### PSO1:

Equip students with the latest IT knowledge and skills to tackle real-world challenges.

### PSO2:

Foster leadership, critical thinking, problem-solving, and communication skills for IT careers.

### PSO3:

Encourage entrepreneurship and innovation through research, start-up projects, industry collaborations, and business skills.

PO1	Engineering Knowledge
PO2	Problem Analysis
PO3	Design/development of solutions
PO4	Conduct investigations of complex Problems
PO5	Modern tool usage
PO6	The engineer and society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long learning

*S.P. Ravikiran*  
Head  
Department of Information Technology  
Hindustan College of Science & Technology  
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FARAH (MATHURA)

Director

Hindustan College of  
Science & Technology  
FARAH (MATHURA)

CONVENOR



**Dr. Shankar Thawkar**  
Associate Professor  
HOD, IT

VAC COORDINATOR

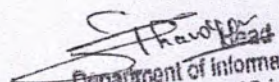


**Mr. Ajay Raj Parashar**  
Assistant Professor  
IT Department

CO-CONVENOR

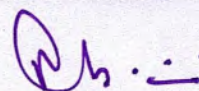


**Mrs. Deepti Mittal**  
Assistant Professor  
Dy. HOD, IT

  
Department of Information Technology  
Hindustan College of Science & Technology  
Farah, Mathura

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FARAH (MATHURA)

## SPEAKERS



**Mr. Ajay Raj Parashar**  
Assistant Professor  
IT Department

*S. Thakur*  
Head

Department of Information Technology  
Hindustan College of Science & Technology  
Farah, Mathura

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# COURSE OUTLINE

## Problem Solving using C and C++ (VACIT-001)

### Module 1: Functions in C/C++

- Introduction to functions
- Alt function syntax
- Function return type deduction
- Static, const, and inline functions
- Default parameters
- Overloaded functions (operator and members)
- Friend Functions
- Overriding functions

### Module 2: Arrays and Pointers in C/C++

- Introduction to arrays and pointers
- Smart pointers
- Pointers and dynamic memory allocation
- Type inference
- Array and pointer arithmetic and indirections

### Module 3: Secure Coding Practices in C/C++

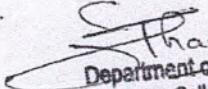
- Common string, integer, and dynamic memory allocation errors
- Integer and dynamic memory allocation vulnerabilities
- String vulnerabilities and mitigation strategies

### Module 4: Exception Handling and I/O in C/C++

- Introduction to errors and exceptions
- Exception mechanisms
- Exceptions and polymorphism
- Stack unwinding and cleanup
- Common error handling issues
- Using streams for input and output
- String streams, file streams, and bidirectional I/O
- Dynamic memory allocation model
- Working with dynamic memory, array-pointer duality, and smart pointers.

### Text Book/References:

- Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publications Pvt Ltd Delhi India.

  
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Hindustan College of Science & Technology  
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# LECTURE PLAN

## Problem Solving using C and C++ (VACIT-001)

### Module 1: Functions in C/C++

- Lecture 1: Introduction to functions
- Lecture 2: Alt function syntax
- Lecture 3: Function return type deduction
- Lecture 4: Static, const, and inline functions
- Lecture 5: Default parameters
- Lecture 6: Overloaded functions (operator and members)
- Lecture 7: Friend Functions
- Lecture 8: Overriding functions

- Lecture 24: Dynamic memory allocation model
- Lecture 25: Working with dynamic memory, array-pointer duality, and smart pointers
- Lecture 26: Review of functions in C/C++
- Lecture 27: Review of arrays and pointers in C/C++indirections
- Lecture 28: Review of secure coding practices in C/C++
- Lecture 29: Review of exception handling and I/O in C/C++
- Lecture 30: Final Exam Review

### Module 2: Arrays and Pointers in C/C++

- Lecture 9: Introduction to arrays and pointers
- Lecture 10: Smart pointers
- Lecture 11: Pointers and dynamic memory allocation
- Lecture 12: Type inference
- Lecture 13: Array and pointer arithmetic and indirections

### Module 3: Secure Coding Practices in C/C++

- Lecture 14: Common string, integer, and dynamic memory allocation errors
- Lecture 15: Integer and dynamic memory allocation vulnerabilities
- Lecture 16: String vulnerabilities and mitigation strategies

### Module 4: Exception Handling and I/O in C/C++

- Lecture 17: Introduction to errors and exceptions
- Lecture 18: Exception mechanisms
- Lecture 19: Exceptions and polymorphism
- Lecture 20: Stack unwinding and cleanup
- Lecture 21: Common error handling issues
- Lecture 22: Using streams for input and output
- Lecture 23: String streams, file streams, and bidirectional I/O fstream

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**HINDUSTAN COLLEGE OF SCIENCE & TECHNOLOGY, FARAH - MATHURA**

Department of Information Technology

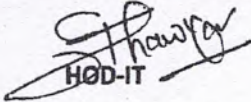
Value Added Course - Registration Form

VACIT-001 - Problem Solving using C/C++

Session: 2018-2019

From 6th Feb'2019 - 16th April'2019

S.N.	Roll No.	Name of the Student	Department	Semester
1	1606413023	KASHIF KHAN	IT	4TH
2	1706413001	ADAM SIRAJ	IT	4TH
3	1706413002	ADITYA KUMAR	IT	4TH
4	1706413003	AMAN VERMA	IT	4TH
5	1706413004	AMBIKESH MISHRA	IT	4TH
6	1706413005	ANANT CHITRANSH	IT	4TH
7	1706413006	ANSHU GUPTA	IT	4TH
8	1706413007	APOORVA SINGH	IT	4TH
9	1706413008	DEVENDRA BAGHEL	IT	4TH
10	1706413009	DIVYANSH DIXIT	IT	4TH
11	1706413010	GAURAV JAIN	IT	4TH
12	1706413011	HIMANSHU SHARMA	IT	4TH
13	1706413012	HIMANSHU SAXENA	IT	4TH
14	1706413013	KRISHAN VEER BAGHEL	IT	4TH
15	1706413014	MANSI SHARMA	IT	4TH
16	1706413015	MEHUL CHATURVEDI	IT	4TH
17	1706413016	MOHIT SHARMA	IT	4TH
18	1706413017	MONA SHARMA	IT	4TH
19	1706413018	NANCY SHARMA	IT	4TH
20	1706413019	NAVIN KUMAR	IT	4TH
21	1706413020	NIKHIL YADAV	IT	4TH
22	1706413022	NOORAIN KHAN	IT	4TH
23	1706413023	PRASHANT PATHAK	IT	4TH
24	1706413024	PRASHANT KUMAR	IT	4TH
25	1706413025	PRATIBHA SHARMA	IT	4TH
26	1706413026	PRIYAM DUBEY	IT	4TH
27	1706413027	RAJEEV	IT	4TH
28	1706413028	SAGAR SINGHAL	IT	4TH
29	1706413029	SAMBHAV GOYAL	IT	4TH
30	1706413030	SARTHAK JAIN	IT	4TH
31	1706413031	SHIVAM SAXENA	IT	4TH
32	1706413032	SHIVANI PARASHAR	IT	4TH
33	1706413033	SHUBHAM RAJPUT	IT	4TH
34	1706413035	SUYASH GUPTA	IT	4TH
35	1706413037	VISHAL KURELE	IT	4TH
36	1706413038	VISHPENDRA CHAHAR	IT	4TH

  
HOD-IT

Department of Information Technology  
Hindustan College of Science & Technology  
Farah, Mathura

  
Program Coordinator

  
Director  
Hindustan College of  
Science & Technology  
FARAH (MATHURA)



# Hindustan College of Science & Technology

Agra-Delhi Highway (NH-2), Farah, Distt. Mathura - 281 122

## PRACTICAL ATTENDANCE REGISTER

Academic Year : 2018 - 2019

Semester : IV

Teacher's Name Mr. Ajay Parashar

Designation A.P. (Information Technology)

Sr. No.	Class / Branch	Subject	Practical	Load (Hrs. / Week)
1.	4IT-A	Value Added Course (C/IT)		2 hr
2.				
3.				
4.				
5.				

*S. Thakur*  
Head  
Department of Information Technology  
Hindustan College of Science & Technology  
Farah, Mathura

*[Signature]*  
Director

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FARAH (MATHURA)

VACIT-001 (2018-19)

HINDUSTAN COLLEGE OF SCIENCE & TECHNOLOGY, MATHURA

CLASS B-Tech

SECTION / BRANCH IT

BATCH A

S. No.	Roll No.	Name of Student	Attendance															
			Date	6/2	13/2	27/2	6/3	13/3	27/3	10/4	17/4	24/4	1/5	8/5	15/5	22/5		
			No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	170641300	Adem Leraj		2	4	6	A	8	10	12	14	16	18	20	22	24	26	28
2		Aditya Kumar		A	A	2	4	A	A	6	8	10	12	14	16	18	20	22
3		Aman Verma		2	A	4	6	8	10	12	14	16	18	20	22	24	26	28
4		Anshika Mishra		2	4	6	A	8	10	12	14	16	18	20	22	24	A	26
5		Anant Chitransh		2	4	6	A	8	10	12	14	16	18	20	22	24	26	28
6		Anshu Gupta		2	4	6	8	10	A	12	A	A	A	14	16	18	20	22
7		Apoorva Singh		A	2	4	A	6	A	8	10	12	14	16	18	20	22	A
8		Devendra Baghel		2	4	A	6	8	A	10	12	14	16	18	20	22	24	26
9		Dhyanesh Dixit		2	4	6	8	10	A	12	14	16	18	20	22	24	26	28
10		Crabhu Jain		2	4	6	8	10	A	12	14	16	18	20	22	24	26	28
11		Himanshu Sharma		2	4	6	8	10	A	12	14	16	18	20	22	24	26	28
12		Himanshu Saxena		2	4	6	8	A	10	A	12	14	16	A	A	A	18	20
13		Kaishora Veer Baghel		A	2	4	6	8	10	12	14	16	18	20	22	24	26	A
14		Mansi Sharma		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
15		Mehul Chaturvedi		2	4	A	A	6	8	10	12	14	16	18	20	22	24	26
16		Mohit Sharma		2	4	6	8	10	A	12	14	16	18	20	22	24	26	28
17		Mona Sharma		2	4	6	8	A	10	12	14	16	18	20	22	24	26	28
18		Nancy Sharma		2	4	6	8	A	A	10	12	14	16	18	20	22	24	26
19		Nanika Kumar		2	4	6	8	A	10	12	A	A	A	14	16	18	20	22
20		Nikhil Yadav		2	4	A	6	8	10	12	14	16	18	20	22	24	26	28
22		Noorain Khan		2	4	6	8	10	12	A	14	16	18	20	22	24	26	A
23		Prashant Pathak		2	4	6	A	8	10	12	14	16	18	20	22	24	26	28
24		Prashant Kumar		2	4	6	8	A	10	12	14	16	18	20	22	24	26	28
25		Pratibha Sharma		2	4	6	A	8	10	12	14	16	18	20	22	24	26	28
26		Priyam Debey		2	4	6	8	10	A	12	14	16	18	A	A	A	20	22
27		Rajesh		2	A	4	6	8	10	A	12	14	16	18	20	22	24	26
28		Sagar Simal		A	2	4	6	8	10	12	14	16	18	20	22	24	26	28
29		Sankha Singh		2	4	6	8	A	10	12	14	16	18	20	22	24	26	28
30		Sarthak Saxena		2	4	6	8	10	A	12	14	16	18	20	22	24	26	28
31		Shivam Saxena		2	4	A	6	8	10	12	14	16	18	20	22	24	26	28
32		Shivani Parashar		2	4	6	A	8	A	10	12	14	16	18	20	22	A	24
33		Shubham Rijpat		2	A	4	A	A	6	A	A	A	8	10	12	14	16	
35		Suyash Gupta		2	A	4	6	8	10	12	14	16	18	A	A	A	20	22
37		Vishal Kurele		2	A	4	6	8	A	10	12	14	16	18	20	22	24	26
38		Vishwendra Chahal		2	4	6	8	10	A	12	14	16	18	20	22	24	26	28

Sign. of Faculty

(2)

Department of Information Technology  
Hindustan College of Science & Technology

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Director  
Hindustan College of  
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FARAH (MATHURA)

VACIT-001 (2018-19)

HINDUSTAN COLLEGE OF SCIENCE & TECHNOLOGY, MATHURA

CLASS B.Tech

SECTION / BRANCH IT

BATCH A

S. No.	Roll No.	Name of Student	Attendance														
			Date No.	6/2	13/2	27/2	6/3	13/3	27/3	13/4	15/4	15/4	15/4	18/4	16/4	16/4	20/4
36	146413023	Kashif Khan	2	A	A	4	6	8	A	10	12	14	A	A	A	16	18

Note - Each Lecture of 02 Hrs.  
 Total Lectures = 02 x 15 = 30

Sign. of Faculty

(4) Director

Hindustan College of Science & Technology FARAH (MATHURA)

Department of Information Technology  
 Hindustan College of Science & Technology  
 Farah, Mathura

**HINDUSTAN COLLEGE OF SCIENCE & TECHNOLOGY, FARAH, MATHURA**  
**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**CLASS TIME TABLE FOR EVEN SEMESTER 2018-19**

SESSION: Jan 2019 -Jun 2019  
 YEAR/SEM: II/ 4 IT-A

W.E.F:22/01/2019  
 ROOM NO: 221 A

CLASS TEACHER: Mr. Ajay Parashar  
 COUNSELORS: Mr. Ajay Parashar (A1)  
 Mr. Mohit Singh (A2)

Day \ Time	I	II	III	IV	1:30-02:20	V	VI	VII
	10:10-11:00	11:00-11:50	11:50-12:40	12:40-01:30		02:20-03:10	03:10-04:00	04:00-04:50
MONDAY	OS	HVPE	ITC	TAFL		ALA	PLP Lab 4IT-A1 Lab-5 TAFL Lab 4IT-A2 Lab-4	
TUESDAY	TAFL	SE	ITC	OS		OS Lab 4IT-A1 Lab-6		ALA(T) A1
WEDNESDAY	SE	PDP		ALA		PLP Lab 4IT-A2 Lab-5		
						VALUE ADDED COURSE (VACIT001) PROBLEM SOLVING USING C/C++		
THURSDAY	OS	SE	TAFL	HVPE		SE Lab 4IT-A1 Lab-4		ITC(T) A1
FRIDAY	ITC	HVPE	OS	SE		OS(T) A2	ALA(T) A2	TAFL(T) A2
						ALA	TAFL 4IT-A1 Lab-4	
SATURDAY	ALA	PDP		ITC			OS Lab 4IT-A2 Lab-6	
						TAFL	TAFL(T) A1	OS(T) A1
							SE Lab 4IT-A2 Lab-4	

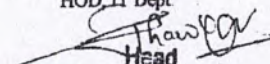
		Class Room No			
Subject Code	Name of the Subject	Lecture	Tutorial (A1)	Tutorial(A2)	Name of the Faculty
ROE-049	Applied Linear Algebra (ALA)	221 A			Dr. Harendra Singh
RVE-401	Universal Human Values & Professional Ethics (HVPE)	221 A			Dr. Manata Sharma
REC-406	Information Theory and Coding (ITC)	221 A			Mrs. Rohini Mittal
RCS-401	Operating System (OS)	221 A			Mr. Ajay Parashar
RCS-402	Software Engineering (SE)	221 A			Mrs. Deepti Mittal
RCS-403	Theory of Automata and Formal Languages (TAFL)	221 A			Mr. Mohit Singh

		Practical Room No.		
Lab Code	Name of the Lab	Lab No (A1)	Lab No (A2)	Name of the Faculty
RCS-451	Operating System Lab(OS Lab)	Lab-6	Lab-6	Mr. Ajay Parashar
RCS-452	Software Engineering Lab (SE Lab)	Lab-4	Lab-4	Mrs. Deepti Mittal
RCS-453	Theory of Automata and Formal Languages Lab (TAFL Lab)	Lab-4	Lab-4	Mr. Mohit Singh
RCS-454	Python Language Programming Lab (PLP Lab)	Lab-5	Lab-5	Mr. Rajeev Kumar
VACIT001	VALUE ADDED COURSE- PROBLEM SOLVING USING C/C++	Lab6	Lab5	Mr Ajay Parashar

(Mr. Rajeev Kumar)  
 TT/ IC, IT Dept

(Mr. Shankar Thawkar)  
 HOD, IT Dept

  
 Director  
 Hindustan College of  
 Science & Technology  
 FARAH (MATHURA)

  
 Head  
 Department of Information Technology  
 Hindustan College of Science & Technology  
 Farah, Mathura



## **CERTIFICATE OF COMPLETION**

### **Department of Information Technology**

**Academic Session 2018-19**

This is to certify that Mr. Adam Siraj, Roll No. 1706413001  
of Course B. Tech. Information Technology, IV Semester  
has successfully completed 30 hours Value Added Course titled  
“PROBLEM SOLVING USING C AND C++” (Course Code: VACIT-001).

**Mr. Shankar Thawkar**  
Head of Department

**Mr. Ajay Raj Parashar**  
Course Coordinator

**Dr. R. K. Upadhyay**  
Director



## **CERTIFICATE OF COMPLETION**

### **Department of Information Technology**

**Academic Session 2018-19**

This is to certify that Mr. Sambhav Goyal, Roll No. 1706413029  
of Course B. Tech. Information Technology, IV Semester  
has successfully completed 30 hours Value Added Course titled  
“PROBLEM SOLVING USING C AND C++” (Course Code: VACIT-001).

**Mr. Shankar Thawkar**  
Head of Department

**Mr. Ajay Raj Parashar**  
Course Coordinator

**Dr. R. K. Upadhyay**  
Director

Director  
Hindustan College of  
Science & Technology  
FARAH (MATHURA)



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Academic Session 2018-19

This is to certify that Ms. Mansi Sharma, Roll No. 1706413014  
of Course B. Tech. Information Technology, IV Semester  
has successfully completed 30 hours Value Added Course titled  
“PROBLEM SOLVING USING C AND C++” (Course Code: VACIT-001).

**Mr. Shankar Thawkar**  
Head of Department

**Mr. Ajay Raj Parashar**  
Course Coordinator

**Dr. R. K. Upadhyay**  
Director

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**Department of Information Technology**  
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This is to certify that Mr. Ambikesh Mishra, Roll No. 1706413004  
of Course B. Tech. Information Technology, IV Semester  
has successfully completed 30 hours Value Added Course titled  
“PROBLEM SOLVING USING C AND C++” (Course Code: VACIT-001).

**Mr. Shankar Thawkar**  
Head of Department

**Mr. Ajay Raj Parashar**  
Course Coordinator

**Dr. R. K. Upadhyay**  
Director

  
Director