

DEPARTMENT OF MATHEMATICS

CERTIFICATE COURSE DETAILS

NAME OF THE COURSE

Basics of GeoGebra

COURSE CODE

CPCC44

COURSE DETAILS

Total hours: 30

COURSE COORDINATOR

Ms. Tintumol Sunny

PARTNERSHIP WITH

MATH Lab Cochin

ABOUT COLLEGE

Christ College (Autonomous) Irinjalakuda, established in the year 1956 by CMI fathers has always been place where young generations are moulded towards a bright future. College has excellent infrastructure, with state-of-the-art laboratories, seminar rooms and lecture halls. The campus is Wi-Fi enabled. Presently College is house for 4500+ students. 200 teaching staff and 45 supporting staff. The strength of the College lies in its hardworking and tech savvy teachers who are eager to involve in all matters of students. The lush green campus with gardens and open gym is moving towards the next phase on education both offline and online.

AIM OF THE COURSE

To understand the features and uses of the software 'GeoGebra'. To learn the different tools and their applications and various commands in GeoGebra. To create geometrical shapes and plot mathematical functions in GeoGebra. To depict the geometrical meaning of calculus using GeoGebra. To construct 3D shapes and objects in GeoGebra

PROGRAM SPECIFIC OUTCOME

- To learn the concepts of mathematics in an interesting way
- To Understand and present mathematical ideas using the GeoGebra software

• To visualize 3D functions and shapes and thus learn 3D related topics easily.

SUGGESTED METHODOLOGY OF TEACHING AND LEARNING

- Online/Offline classes
- Practical sessions on GeoGebra
- Practicing constructions in GeoGebra

COURSE OUTCOMES

- Co1 Understanding a new software and its interface
- Co2 Plotting lines, points, polygons and circles in GeoGebra
- Co3 Learn new tools and plot functions in GeoGebra
- Co4 Construct conics in GeoGebra, plot complex numbers in GeoGebra

SYLLABUS

Module 1: INTRODUCTION TO GEOGEBRA

Introduction to Euclid's Geometry- Euclid's axioms, Euclid's postulates.

Introduction to GeoGebra-GeoGebra Classic' features- How to install.

GeoGebra interface-Menu bar, Toolbar, input bar- Algebra View and Graphic's View.

Module 2: BEGINNING GEOGEBRA

Points and lines-plotting points, lines, line segments, point of intersection, mid-point, perpendicular and parallel lines.

Module 3: NEW TOOLS AND PLOTTING FUNCTIONS

Slider tool, Trace and Animation, Area using GeoGebra, Checkbox and Input box, Plotting functions-Polynomial, modulus, rational, signum, greatest integer, square root. Trigonometric functions.

Module 4: CONIC SECTIONS, SEQUENCE AND COMPLEX NUMBERS

Parabola, Ellipse, Hyperbola- Various commands to construct and tools for conics. Sequences and Sum, Complex Numbers plotting, arithmetic operations, modulus, argument.

BASICS OF GEOGEBRA -	CERTIFICATE COURSE ATTEND	ANCE
-----------------------------	----------------------------------	------

	å			1			pa	sice	-	1	naco	ge.	log	2+	20	23	6		0	s		e,			10	ů,			-	
	6	570	2104 10	Sec.	3	2	m			m	5	in the second se		1	she		Caka		26-			(B k		1. 5.	10	(ale			37	
	0	2420	170	3 /2	202	20	à	3	23	3	1 ser	S.	E.S.	3	HA .	123	123	5	sele Jas.	1 3	1 0	1/1/23(3	3	1 /33	1/23	1, 123				
L. No	Name	27	25	je	SIS	20	7/3	stake	96	E pa	1315	and a	cleks	7/0/23	10 m	whe	17/6	21/4/23.	ate		1-1-	10	1/4	12/1	141	10		ALTICL BURG	419	and an other free
	Devika A.V.	×	×	a	a	a	8	x	a	×	x		×	×	×	××	x	×	× ×	X			×		×	X.				
	Harisankar V.T.	x	K	x	×	x	r	a	x	x	X	1	X	a	xa	X	X	x	x x		1 ×	*	×	X	X	-			1	Sec. 31
35		x	×	x	×	x	x	a	x	r	a	X	×	×	xo	X	Y.	×	× ,	×	X	×	x	X	×		1		-	
27	Hashmiya K.H.	X	a	x	×		x	x	x	*	x	Y	×		x	* 4	x	x	* >	X)	X X	X	X	XY	1		A Ser	here's	in the se
20	Hena Joby	x	a	x	×	x	×	x	x	a	x	Y	×	×	x.	xx	X	×	x ,	1 1	1	c x	×	X	x	1		-	in the	1000
20	Hridhya M.M.	X	x	x	x	*	x.	X	×	X	x	2	x	a	×	xx	a	r	x x	12	r x		a	æ	X	K		2.132	1000	-
37	John Joseph V	×	X	x	x	x	x	x	x	×	r	x	a			ax		x	xa		x	X	a	X	×	A				-2.4
40	Leon C Liju	x	×.	X	a	a	x	x	1	K	1	20	x	×	xx	rx	x .	x	xa	X	×	×	x	x	x	K	1	1000	111	
	Adith V	a	x	*	X	X	*	×	x	x	X	1	a	x	xo	a	x	a	xx	x	×	x	×		X	X			1	Call and
42	Nandana Jayadevan	x	a	-	X	x	×	K	K	X.	x	0	x	x	c.)	< x	x	x	xx	1	x	· . x	x	X	×	x			to low	101 1
43	Navya K.B.	x	x	a	X	x	x	X	X	×	x	1	a	a	xo	a	a	X	x	ra	×	c a	X	a	x	×	*	-	10100	1.17.18
44	Nisma K.S.	x	X	x	×	x	X	x	x	X	X	X	a	ale	1		a	a	xd	la	×	a	a	x	a	x	4		6 Para	in the second
45	Sabarinadh P.S.	a	x	x	X	x	X	×	a	K	1	1	×	×		x a	x	×	ax	a	X	ca	x	-	x		4		191	10127-14
46	Saniya P.A.	a	x	X	×	x	1	×	a	X	X	x	x	a	$\langle \rangle$	< x	x	x	x a			CX		+	×	-	×		and the second second	
47	Sayanth V.M.	1 24		-	a	a	a	a	x	K	a		-	×	< x	×	X	XI	XX	1	×	XX	X	×	X	X				
48	Sreenandan A	x	x.	X	a	a	F	x	X	X	X	x	×	X	XX	a	x	X	x	()	X	×	×	×	×	-	1		-	a has
49	Sweety K.S.	X. 1	a	-	X	x	a	a	X	X	×	1 4 1	x	x	x	X	XX		x	+ 1	rx	x	X	×		X		Nue .		5.0
50	Adithya E.S.	x		X	x	a	K	X	x	X	X	A		alo		a		xI	ad	1 x	10	a x	K	à	a	4			1 section	192
51	Vishnu Rajesh	X	r	x		Y	X	×	X	X	X	X	-			a	ex	x	x	a	ra	ra	a	. *	x	10				3.4
52	Akshay P.S.	a	x	X	X	x	x	a	X	a	r	x	-	a	-			x	x . x	1	a	x x	a	X	X	1	4	and i	· · · · ·	and the
53	Amai Jayader	a	x	a	x		a	x	1	a	K	V	x		-	xx			XX		X	x x	X	×	×	()				
54	Anapha V.B.	80		K	x	a	x	X	X	a	x	F				ax	a	X	x	2	x	a a	2 1	ra	14	a	9		- in	
55	Anantha Krishna K.A.	X	a	X	x	X	a	x	X.	X	1		x	x	ra	e x	a	x	a		a	KK	×	a	1	a	2		1 miles	in and
56	Anaswara I.V.	XX	X	×	18	X.	2	X .	1	10	f		1	1	1				,		1	1	X	17	1	X	K			
	1.20		V.	x	35	13	X	8	1	11			- 1-	1	1	1			1					19			X		-	
	and the second sec		x.	-	<u>K</u>	6.2	×	5 -2	53	12	1	27	+	1		1		1	T							X	¥		-	In Tax
-			2	-	-	1	1	1	1 1	1.12		*	+	1	+	1	1	-+	-	1	1	1		•,		XI	1 -			
	the second second second	1.1 %		54			3			1	1	-	+		4	1		t	-	+			1 3	ŀ	1	v	4		-	1
					4		1	1.1	X	2.	×	4	+	-	+	+	++			+		1		1	1		K		1.1	1
				14		1			-	1	1	-	-+	-	+	+	+			+		-	-	1,	1	-				
			~	3	1		16		×	2	-	X	+	4	4	+	++	-	-	+	+	+	+	1	1	13	1			1.14
				-					n	x	y.	X	-	1	+	+-	++	41		4	4	+		+		1			-	5.200
			-								w.	1	+	1	-	1	1		. 1	+	-	-	4	+	÷1	-	1		1. 18	Ser.
								1			×	-	-+	1-	1	1-	11.	14		+	-		1	4	t	<u>A</u>		- <u> </u>		had
-	and the property of the second second		¥.	1		-	-			1		1	-		-	1	11	ł	14	1	1.	1	1	I	11	2	<u></u>	- toto	7	
		-	-			-				-	-	-																		
2	2 P Start Barrier											1														-				

Certificate Course-Basics of Geogebra CPCC44

Assessment Procedure

Assignments : 40%

Examination (Theory and Practical) : 60%

Course Outcomes

Upon completion of the course, students will be able to:

- 1. Understand the new software Geogebra and its interface
- 2. Plotting lines, points, polygons and circles in Geogebra
- 3. Learn new tools and plot functions in Geogebra
- 4. Construct conics in Geogebra, Plot complex numbers in Geogebra

Certificate Course-Basics of Geogebra CPCC44

Number of students	34
Date of examination	20-7-2023
Total students who passed exam	32
Total course duration	30 hrs

Teacher Coordinator Report

Feedback analysis:

- Students found the course highly engaging and informative.
- The hands-on approach helped students gain practical knowledge in GeoGebra, enhancing their understanding of mathematical concepts.
- Participants reported increased confidence in applying GeoGebra for teaching and learning purposes.
- Many students expressed interest in advanced GeoGebra courses for further skill development.

Course Coordinator: Tintumol Sunny





Affiliated to University of Calicut and Reaccredited by NAAC with 'A++' & SAAC 'A+' www.christcollegeijk.edu.in

POSTGRADUATE AND RESEARCH DEPARTMENT OF MATHEMATICS

Certificate

This is to certify that

Ms./Mr. <u>ANAMHA V B</u> [<u>CCAWSM7002</u>] has successfully completed the certificate course on **Basics of Geogebra** with Grade <u>A</u>, conducted by Postgraduate and Research Department of Mathematics, Christ College (Autonomous), Irinjalakuda during the academic year 2023-24.



Model Test Paper(Theory)

Certificate Course Exam in Basics of GeoGebra

Time: 20 minutes Total Marks: 10 Instructions: Choose the most appropriate answer for each question.

- 1. Which window in GeoGebra shows the algebraic representation of objects?
 - a) Graphics window
 - b) Spreadsheet view
 - c) Algebra window
 - d) CAS view
- 2. What is the default color of points in GeoGebra?
 - ∘ a) Red
 - o b) Blue
 - o c) Green
 - o d) Black
- 3. Which tool is used to create a perpendicular line in GeoGebra?
 - o a) Parallel Line
 - o b) Angle
 - o c) Perpendicular Line
 - o d) Normal Line
- 4. What keyboard shortcut is used to open a new GeoGebra window?
 - o a) Ctrl + N
 - b) Ctrl + O
 - o c) Ctrl + W
 - o d) Ctrl + S
- 5. Which of these is NOT a view option in GeoGebra?
 - a) Graphics View
 - o b) Algebra View
 - o c) Programming View
 - o d) Spreadsheet View
- 6. When creating a slider in GeoGebra, what is the default minimum value?
 - ∘ **a) 0**
 - o b)-5
 - o c) -10
 - o d) 1
- 7. Which tool would you use to measure the distance between two points?
 - a) Angle Tool
 - b) Distance or Length Tool
 - o c) Area Tool
 - o d) Circle Tool
- 8. What type of file extension does GeoGebra primarily use for saving files?
 - ∘ a).geo
 - o b).ggb
 - o c).gbr
 - o d).gsp
- 9. Which of these transformations is NOT available in GeoGebra?
 - o a) Reflection
 - o b) Rotation
 - \circ c) Morphing
 - o d) Translation

10. What happens when you right-click on an object in GeoGebra?

- a) The object is deleted
- b) Properties dialog opens
- c) The object is copied
- o d) The object becomes hidden

Answer Key:

- 1. c) Algebra window
- 2. b) Blue
- 3. c) Perpendicular Line
- 4. a) Ctrl + N
- 5. c) Programming View
- 6. b) -5
- 7. b) Distance or Length Tool
- 8. b).ggb
- 9. c) Morphing
- 10. b) Properties dialog opens

Marking Scheme:

- Each question carries 1 mark
- No negative marking
- Total marks: 10

Model Test Paper(Practical)

- 1. Plot the function $f(x) = 3x^2 + 2x 3$.
- 2. Make a point A and type (x(A) + 3, y(A) + 2) in the input bar. What is the speciality of the coordinates of the new point? Change the position of A and check.
- 3. Enter the equations 5x + 4y = 40 and 5x + 4y = 9 in the input bar. Do these lines intersect?
- 4. Using an input box, find f(0), f(1), f(-1) and f(2) where $f(x) = \sqrt{x}$.
- 5. Draw a circle in GeoGebra and join two points on it to draw a chord. Mark its midpoint and enable Trace on. Also enable Animation for end points of the chord. What is the path of midpoint of the chord? Enable Trace on for the chord also. Change the colour of the chord.

Stu	ident List
Reg. No.	Student Name
CCAWSMT001	ATHIRA RANJEETH
CCAWSMT002	ANAGHA V B
CCAWSMT003	SWEETY K S
CCAWSMT005	ATHULYA KRISHNA K U
CCAWSMT006	NISMA K S
CCAWSMT007	HENA JOBY
CCAWSMT008	BHADRA A M
CCAWSMT009	DEVIKA A V
CCAWSMT010	ADITH V
CCAWSMT012	ΝΑΥΥΑ Κ Β
CCAWSMT013	ATHUL KRISHNA K S
CCAWSMT014	ABHAY SANKAR C
CCAWSMT015	LEON C. LIJU
CCAWSMT016	BHAMA A M
CCAWSMT017	DEVANANDA T S
CCAWSMT018	HARISANKAR V T
CCAWSMT019	AKSHAY P.S
CCAWSMT020	SREENANDAN A
CCAWSMT021	SABARINADH P S
CCAWSMT022	ANANTHAKRISHNA K A
CCAWSMT023	ANGEL SABU
CCAWSMT025	HRIDHYA M M
CCAWSMT026	NANDANA JAYADEVAN
CCAWSMT027	SANIYA P A
CCAWSMT028	HASHMIYA K H
CCAWSMT029	SAYANTH . V . M
CCAWSMT030	JOHN JOSEPH V
CCAWSMT031	AMAL JAYADEV
CCAWSMT032	ADITHYA E S
CCAWSMT033	ASHAMZ M BABU
CCAWSMT034	ANASWARA I V
CCAWSMT035	VISHNU RAJESH
CCAWSMT036	ADHARSH BABU
CCAWSMT037	BHAGYALAKSHMI P V

Report on Certificate Course: Basics of GeoGebra - CPCC44

This certificate course aims to introduce students of B.Sc Maths to the fundamental concepts and applications of GeoGebra, an interactive mathematics software that combines geometry, algebra and graphing.

Course Objectives

- Familiarize students with the GeoGebra interface and basic tools.
- Enable students to create geometric constructions and mathematical visualizations.
- Develop skills in solving mathematical problems using GeoGebra.
- Enhance understanding of mathematical concepts through dynamic visualization.

Course Structure

Total Duration: 30 Hours

Syllabus :

Module 1: Introduction to GeoGebra Introduction to Euclid's Geometry-Euclid's axioms, Euclid's postulates. Introduction to GeoGebra-'GeoGebra Classic' features- How to install. GeoGebra interface- Menu bar, Toolbar, input bar- Algebra View and Graphics View

Module 2- Beginning GeoGebra Points and lines- plotting points, lines, line segments, point of intersection, mid-point, perpendicular and parallel lines. Polygons- Regular polygons, Rigid Polygon Circles- Tool and commands

Module 3- New tools and Plotting Functions Slider tool, Trace and Animation, Area using GeoGebra, Checkbox and Input box, Plotting functions- Polynomial, modulus, rational, signum, greatest integer, square root. Trigonometric functions.

Module 4- Conic Sections, sequence and complex numbers Parabola, Ellipse, Hyperbola- Various commands to construct and tools for conics. Sequences and Sum, Complex Numbers- plotting, arithmetic operations, modulus, argument

Assessment Procedure

Assignments : 40%

Examination (Theory and Practical) : 60%

Course Outcomes

Upon completion of the course, students will be able to:

- 1. Understand the new software Geogebra and its interface
- 2. Plotting lines, points, polygons and circles in Geogebra
- 3. Learn new tools and plot functions in Geogebra
- 4. Construct conics in Geogebra, Plot complex numbers in Geogebra



Attendance

	3						Ba	sta	Ŵ	1	neo	92	loea	41	200	2.3	6		3		5			e	Ľ,	
		573	220	2	m	'n				1		1		-		1	S		3420		YE		1		(sha)	47
	6	242	4	3 /2	202	20	à	3.	223	62.00	2 ar	5	2	2	3 3	2		2	23(2	3	3	50	123	123	
. .		t.	3		31.	2	7/2	sisk	964	10 s	1315	ates.	ci ch	Tichas micha	10	15/6/23	21/4/23.	246 23	254236	50/4/4	1/1/23	24 T H	12/2	14	15/	
No.	Name	.8	EV		.,	1		-			1.17	-	12 20		-	11	1							×	1	
	Devika A.V.	x	x	a	a	a	x	K	a	×	X	-		* >	· / /	XX	1	1	*	*	×)		X	×	x	and the second
35	Harisankar V.T.	x	1	x	X	x	r	a	x	r	x	X	-		e a	X	X	X	×	~		· ·	×		12	
36	Hashmiya K.H.	x	x	x	X	x	K	a	x		a	-	-	x)	x a	x	XX	-	×	×	J	+ v	Y		x	A CONTRACTOR OF A CONTRACTOR O
37	Hena Joby	X	a	x	x	1	x		x	r a	X		×	×)	K X	a	K X	1	X	X	-	1 è	1'r	x	12	
38	Hridhya M.M.	x	a	x	x	x	X	x	x		x				xx	x1	X	X	×	~	× *		R	X	1	The Standard State
39	John Joseph V	x	x	x	x	x	r.	x	×	X	r	-		a		ra			×	×	x x	a	X	×	f.	1
40	Leon C Liju	×	1	x	x	x	X	X	x	x	×	1	a_	x		XO							-	x	12	1 1 Strand Rollinghouse
41	Adith V	×	x	X	a	a	x	ĸ	1	5	1	-	- interest			x,								X	12	L. C. Na. S. S. S.
	Nandana Jayadevan	a	x	1	X	x	x	×	r	X	X	-	-			a		1			XX	1	-	×	C	The second second
43	Navya K.B.	*	a	x	X	x	x	K	X		x	2		x x		x	1	X	x		x	1	1		1.	a to strategie
44	Nisma K.S.	x	x	a	x	x	x	X	X	X	x	1				al		x	-			-	1	1	1.	1
4.5	Sabarinadh P.S.	x	X	x	x	x	X.	x	x	+	X	X	a 0			a		x	a	a	xa		-	x	1	1
46	Saniya P.A.	a	x	x	x	x	X	X	a	K	1	-		xa		a)		a	x	a	XX		1	×		
47	Sayanth V.M.	x	x	x	*	x	a	X	a.	X	X	1	X		1	x		-	a	×				-	-	
40	Sreenandan A	x	x	x	a	a	a	a	x	x	a	X.	x)				XX		×	×		< x		×		i i i i i i i i i i i i i i i i i i i
19	Sweety K.S.	X. +	× ·	x	x	x	X	x	X	X	X	1				aj.	XX	(X	~	~	X			-	X	
50	Adithya E.S.	x	a	x	×	x	9	1.9	X	X	-		X		-	X		1				1	10	12	-	
FI	Vishnu Rajesh	X	r	x	x	a	K	X	X	X	×	41	a 0		-	ao		1	ei					x		1
52	Auchon P.C.	a	x	x	x	X	1	*	X	X	×	1				all							1.	1	X	
53	Akshay P.S.	a	x	a	x	x	X	a	X	a	x			2 1		ac		-	·K			x x	-	X		
5	Amal Jayadev	*		x	x	a	a	X	X	a .	x	- 11	X z	-		XX			×	×			x		2 0	
54	Anagha V.B.	X	a	X	x	x	x	X	X	a	x	+	a	2,	(9	x	X X	X	u	a	e x i				2 0	
55 1	Anantha Kristin Ka	1	x	×	1.2	X	a.	X.	X.	X	1	Sit	X	x	ra	r	a x	a	×	a	X			-	+	
6	Inaswara I.V.		V	1	7.	XX	×	8	X	X	2	8		1	1	1-1-	1	1	×.	1-	11	5.	1	+	1	
-				-		× 7	k	2.3	15	134	1	1		1	-	1	13	14	1 1	5		-14	-	4	t	<u>x</u>
-		1	4				1	1	ļ · ,	10		-	-	1	1	1	1	1	1.	5	5	×	×	1	+	*
		- 1					1				1	-	-	1	4	1.1	10	-	1	14		4	-	+	+	1
	A A A A A A A A A A A A A A A A A A A	1 24		11					×	12	~	4	-	1	1		1.	1	1	1	1	1	*	1	4	
-	× 1	- 24			-					1	2	1	-		1		1.	1'	X	1 K	6		3.	+	1	A
		- 2		0		-	1.0					1		6	4		1	12	10	1		0	-+	1	N	5
-	and the state		-		-	-				1.	y	X		1	1		14	L.	X	11		4	0	A	X	1
	100 10 10 10 10 10 10 10 10 10 10 10 10	- y	X	Y	1					1-		18		:	4 5			1	0			1	4	2	l.	
				×.			1	-		1	1	1			1 3		1		14	18		1	1	Y	X	n 19 Salarahada
	and a planting and a		V	. 1.	1		<u></u>	-		1×	*	1				IT	1	T	1.5	Fe.	1	1	1	11	2	AL INDE
	and the second	1			1	-				1		1	+	-												