



**Saintgits**  
College of Engineering  
(Autonomous)

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Autonomous College Affiliated to APJ Abdul Kalam  
Technological University, Thiruvananthapuram

## **CURRICULUM 2021**

### **Master of Computer Applications (MCA)**

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**Kottukulam Hills, Pathamuttom, Kottayam, Kerala – 686532**

## VISION AND MISSION OF THE COLLEGE

### VISION

Saint Gregorios Institutes of Technology and Sciences (Saintgits) will be among the globally renowned educational institutions by 2025. We will be known nationally and internationally for:

- Highly qualified faculty
- Rigorous research culture
- Academic freedom to pursue cutting-edge technology applications
- A strong focus on making our youth ready for promising careers
- A value system with trust and empowerment at all levels

### MISSION

The Saintgits mission is to educate and train students for overall leadership in industry, research, and all other spheres of life through career-oriented course and mentoring programs that:

- Help students to develop critical thinking abilities and a problem-solving approach.
- Emphasize development of confidence with versatility of mind.
- Prepare the individual for a life time of learning and professional growth.

## QUALITY POLICY AND CORE VALUES OF THE COLLEGE

### QUALITY POLICY

“Achieving Excellence in Technical Education, Research and Consulting through an Outcome Based Education focusing on Continuous Improvement and Innovation by Benchmarking against the Global Best Practices”

### CORE VALUES

Professionalism, Commitment, Integrity, Teamwork, Innovation

## PREAMBLE

The quality and standard of computer application professionals are closely linked with the level of the technical education system. The rapid transformation in every sphere of life is supplementing the need to prepare the present fast-paced generation to adapt to the varying knowledge and skill requirement to influence society positively. The future looks up to multi-disciplinary, competent leaders who are Information and Communication Technology ready and driven by strong ethical values.

Saintgits College of Engineering envisions to nurture knowledge, skills and values of the aspiring youth to enable them to become global citizens. For this, the College has evolved a flexible integrated academic curriculum.

The main focus of the Programme is highly purposive and innovative, which sets the pace for workable reforms in higher education suitable and relevant to National and International needs. The academic Programme shall be more enriched, interdisciplinary, flexible and marketable. Through industry interaction program, purposeful linkage between the professional world and educational world shall be established.

Saintgits introduced Outcome Based Education (OBE), which emphasized on sharpening the skills and knowledge of the graduates. To further enhance and improvise the educational process, this regulation, includes pedagogy changes leading to learner centric academic ecosystem.



## **CURRICULUM COMMITTEE OF MASTER OF COMPUTER APPLICATIONS (MCA)**

Saintgits College of Engineering places on record its appreciation and thankfulness to the Head of the Curriculum Committee along with their team of academic experts and industry experts for their valuable inputs in designing the MCA curriculum.

Head of the Curriculum Committee: Dr. Rajesh K. S.  
 Associate Professor and Head  
 Department of Computer Applications  
 Saintgits College of Engineering  
 Kottayam, Kerala 686 532

Team of Academic and Industry Experts:

Prof. Biju Skaria Associate Professor and Head Department of Computer Applications MA College of Engineering Kothamangalam Ernakulam, Kerala	Mr. Destin Joy Lead Architect and Microsoft Regional Director UST Technopark Thiruvananthapuram, Kerala
Dr. Biku Abraham Professor Department of Computer Applications Saintgits College of Engineering, Kottayam	Dr. Shajan Joseph Associate Professor Department of Computer Applications Saintgits College of Engineering, Kottayam

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## I. GUIDE TO MCA PROGRAMME STRUCTURE AND CURRICULUM

### I.I DEFINITION OF CREDIT

Credit Type	Credit Units
I hour Lecture (L) per week	1 credit
I hour Tutorial (T) per week	1 credit
I to 4 hours Project (J) per week	1 credit
I to 2 hours Practical (P) per week	1 credit
3 to 4 hours Practical (P) per week	2 credits
Comprehensive Viva-Voce	6 credits
Main Project	12 credits

### I.2 RANGE OF CREDITS

Credits for the course are earned only on getting a pass grade in the composite evaluation (Continuous Internal Evaluation (CIE) + End Semester Examinations (ESE)). The minimum credits required for a student to be eligible for the award of Master of Computer Applications (MCA) Degree is 86.

### I.3 SEMESTER-WISE CREDIT DISTRIBUTION

Semester	1	2	3	4	Total Credits
MCA	22	22	22	20	86

### I.4 DESCRIPTION OF COURSE CATEGORY

Category	Courses Offered
Mathematics Courses	Mathematical Foundations for Computing
Programme Core Courses	Mandatory courses that need to be studied to meet the requirements of the MCA Programme.
	Comprehensive Viva–Voce : To assess the overall knowledge of the student acquired so far in the relevant field of the Programme.
Programme Elective Courses	Allows a student to choose and study topics of his interests.

Projects and Seminar	<b>Seminar :</b> Encourages and motivates the students to read and collect recent and reliable information from their area of interest confined to the relevant discipline, from technical publications including peer reviewed journals, conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience.
	<b>Mini Project:</b> Enable students to take up investigative/innovative study in the broad field of their Programme, which involves practical work to be assigned by the Department on a group of three/four students, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work by publishing an article in a reputed journal.
	<b>Main Project:</b> Enable students to take up investigative/innovative study in the broad field of their Programme, which involves internship/practical work assigned to a single student under the guidance of a Supervisor. Enable students to gain first-hand exposure of working in the real world and career exploration. It allows students to utilize their key skill sets and knowledge gained from the degree, build professional networks and refine transferable skills by carrying out Internships in industries. This is expected to provide a good initiation for the student(s) in R&D work and technical leadership.
Mandatory Non-credit Courses	Entrepreneurship and Innovations in Technology, Industry Readiness Training and Domain Expertise Workshops. (These courses do not carry credit but needs to be completed satisfactorily(Pass) to fulfill the degree requirements).

## 1.5 COURSE MODE

Course Mode	Description
Theory	Class room/ Online lecture (L) held for presenting themes and concepts related to a course of study, to a large class of students enrolled in that course.
Tutorial	Tutorial classes (T) are run in smaller groups which allows problem solving, group discussion of lecture content and assessment, and presentation/ debate on themes and concepts related to the course
Project	Project works (J) enable students to take up investigative study in the broad field of their Programme, involving practical work to be assigned by the Department on a group of students not exceeding four, under the guidance of a supervisor. This is expected to provide a good initiation for the student(s) in R&D work and technical leadership. The topics range from applications to pure research work.
Laboratory	Practical (P) courses enable the development of a skill, related to the course of study that involves more hands-on learning, discussion, interaction and presentation/ debate on a given topic.
Embedded Theory and Lab (ETL)	Combination of theory (L) blended with practical (P) component.

Project Based Learning (PBL)	Multidisciplinary and dynamic classroom approach that takes a learning-by-doing practice in which students are enabled to actively explore real-world problems and challenges, and acquire a deeper knowledge and skills by participating in simulations, conducting case studies and designing research projects based on different areas of enquiry.
Research Based Learning (RBL)	Seminar prepared and presented by students based on relevant research articles. It is an initiative to understand research in the respective domain area of study.
Massive Open Online Courses (MOOCs)	Online courses delivered through dedicated platforms such as NPTEL/ EdX/ Coursera/ LinkedIn Learning etc.

## 1.6 PROGRAMME HIGHLIGHTS

Course(s)	Description
Induction Programme	A unique two-week induction programme is conducted for the first semester students to make them feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large and nature.
Bridge Courses	Foundation classes mandatorily organized for the first semester students to bridge the gap between eligible course and domain knowledge levels.

## 1.7 COURSE CODE DESCRIPTION

Each course is identified by an alphanumeric code consisting of 07 characters and they are described as follows:

Year of Version	Programme Code	Semester	Course Number		Elective
2	I	C	A	3	X X - X

(i) Year of Version : 2021

(ii) Programme Code :

Programme	Code
MCA	CA

(iii) Semester : I, 2, 3 and 4

(iv) Course Number :

Description		Code
XX	Theory/ETL/RBL	01-05
	Laboratory/Project/PBL	06-08
	Mandatory Non-credit	09
	MOOC	10
X	Elective	A-E

#### 4. CURRICULUM FOR MCA DEGREE PROGRAMME

Every course of MCA Programme shall be placed in one of the six categories as listed in table below:

Sl. No.	Category	Credit
1	Mathematics Courses	4
2	Programme Core Courses	44
3	Programme Elective Courses	16
4	Projects, Seminar and Comprehensive Viva-Voce	22
5	Mandatory Non-credit Courses	P/F
6	MOOCs	P/F
<b>Total Mandatory Credits</b>		<b>86</b>

No semester shall have more than five lecture-based courses and three laboratory/seminar/project courses in the curriculum.

#### SEMESTER I

Exam Slot	Course Code	Course Name	Course Mode	L-T-J-P	Marks			Hrs	Credit
					CIE	ESE	Total		
A	2ICA101	Mathematical Foundations for Computing	Theory	3-1-0-0	40	60	100	4	4
B	2ICA102	Advanced Data Structures	Theory	3-1-0-0	40	60	100	4	4
C	2ICA103	Advanced Software Engineering	Embedded Theory and Lab	3-0-0-1	40	60	100	4	4
D	2ICA104	Advanced Computer Networks	Theory	3-1-0-0	40	60	100	4	4
R	2ICA106	Python Programming Lab	Project Based Learning	0-1-3-0	40	60	100	4	2
S	2ICA107	Web Programming Lab	Laboratory	0-0-0-4	40	60	100	4	2
T	2ICA108	Data Structures Lab	Laboratory	0-0-0-4	40	60	100	4	2
U	2ICA109	Entrepreneurship and Innovations in Technology	Mandatory Non-credit Course	0-1-0-0	20	30	50	1	P/F
<b>Total</b>								<b>29</b>	<b>22</b>

## SEMESTER II

Exam Slot	Course Code	Course Name	Course Mode	L-T-J-P	Marks			Hrs	Credit
					CIE	ESE	Total		
A	2ICA201	Advanced Database Management Systems	Theory	3-1-0-0	40	60	100	4	4
B	2ICA202	Web and Database Security	Theory	3-1-0-0	40	60	100	4	4
C	2ICA203-X	Programme Elective – I	Theory	3-1-0-0	40	60	100	4	4
D	2ICA204-X	Programme Elective – II	Embedded Theory and Lab	3-0-0-1	40	60	100	4	4
R	2ICA206	Advanced Java Programming Lab	Project Based Learning	0-1-3-0	40	60	100	4	2
S	2ICA207	Advanced Database Management Systems Lab	Laboratory	0-0-0-4	40	60	100	4	2
T	2ICA208	Networking and Cyber Security Lab	Laboratory	0-0-0-4	40	60	100	4	2
U	2ICA209	Industrial Readiness Training	Mandatory Non-credit Course	0-1-0-0	20	30	50	1	P/F
								Total	29
									22

## PROGRAMME ELECTIVE - I

Exam Slot	Course Code	Course Name	Course Mode	L-T-J-P	Marks			Hrs	Credit
					CIE	ESE	Total		
C	2ICA203-A	Enterprise Resource Planning	Theory	3-1-0-0	40	60	100	4	4
	2ICA203-B	Agile Project Management		3-1-0-0	40	60	100	4	4
	2ICA203-C	Distributed Systems		3-1-0-0	40	60	100	4	4
	2ICA203-D	Computational Intelligence		3-1-0-0	40	60	100	4	4
	2ICA203-E	Organizational Behaviour		3-1-0-0	40	60	100	4	4

### PROGRAMME ELECTIVE – II

Exam Slot	Course Code	Course Name	Course Mode	L-T-J-P	Marks			Hrs	Credit
					CIE	ESE	Total		
D	2ICA204-A	Business Intelligence	Embedded Theory and Lab	3-0-0-1	40	60	100	4	4
	2ICA204-B	Programming Essentials for Big Data		3-0-0-1	40	60	100	4	4
	2ICA204-C	Wireless Security and Vulnerability Testing		3-0-0-1	40	60	100	4	4
	2ICA204-D	Concepts and Applications of Internet of Things		3-0-0-1	40	60	100	4	4
	2ICA204-E	Ethical Hacking and Cyber Forensics		3-0-0-1	40	60	100	4	4

### SEMESTER III

Exam Slot	Course Code	Course Name	Course Mode	L-T-J-P	Marks			Hrs	Credit
					CIE	ESE	Total		
A	2ICA301	Data Science and Machine Learning	Theory	3-1-0-0	40	60	100	4	4
B	2ICA302	Design and Analysis of Algorithms	Theory	3-1-0-0	40	60	100	4	4
C	2ICA303-X	Programme Elective – III	Embedded Theory and Lab	3-0-0-1	40	60	100	4	4
D	2ICA304-X	Programme Elective – IV	Theory	3-1-0-0	40	60	100	4	4
R	2ICA306	Mobile Application Development Lab	Project Based Learning	0-1-3-0	40	60	100	4	2
S	2ICA307	Data Science Lab	Laboratory	0-0-0-4	40	60	100	4	2
T	2ICA308	Mini Project	Project	0-0-2-2	40	60	100	4	2
U	2ICA309	Domain Expertise Workshop	Mandatory Non-credit Course	0-1-0-0	20	30	50	1	P/F
V	2ICA310	Stream Specific MOOC*	MOOC	0-0-0-0	-	-	-	-	P/F
<b>Total</b>								<b>29</b>	<b>22</b>

\*MOOC certificate obtained within a span of one year to be submitted before the registration of ESE

### PROGRAMME ELECTIVE - III

Exam Slot	Course Code	Course Name	Course Mode	L-T-J-P	Marks			Hrs	Credit
					CIE	ESE	Total		
C	2ICA303-A	Business Analytics	Embedded Theory and Lab	3-0-0-1	40	60	100	4	4
	2ICA303-B	Natural Language Processing		3-0-0-1	40	60	100	4	4
	2ICA303-C	Search Engine Optimization		3-0-0-1	40	60	100	4	4
	2ICA303-D	Multimedia and Animation		3-0-0-1	40	60	100	4	4
	2ICA303-E	Cloud Computing		3-0-0-1	40	60	100	4	4

### PROGRAMME ELECTIVE - IV

Exam Slot	Course Code	Course Name	Course Mode	L-T-J-P	Marks			Hrs	Credit
					CIE	ESE	Total		
D	2ICA304-A	Social Network Analysis	Theory	3-1-0-0	40	60	100	4	4
	2ICA304-B	Deep Learning		3-1-0-0	40	60	100	4	4
	2ICA304-C	Artificial Intelligence		3-1-0-0	40	60	100	4	4
	2ICA304-D	Blockchain Technologies		3-1-0-0	40	60	100	4	4
	2ICA304-E	IPR and Cyber Laws		3-1-0-0	40	60	100	4	4

### SEMESTER IV

Exam Slot	Course Code	Course Name	Course Mode	L-T-J-P	Marks			Hrs	Credit
					CIE	ESE	Total		
A	2ICA401	Comprehensive Viva-Voce	Theory	0-0-0-0	-	100	100	0	6
B	2ICA402	Seminar	Research Based Learning	0-2-0-0	50	-	50	2	2
C	2ICA406	Main Project	Project	-	40	60	100	27	12
Total								29	20

### **Comprehensive Viva-Voce:**

The Comprehensive Viva-Voce in the fourth semester of study shall be conducted based on core subjects studied from first to third semester. The Viva-Voce will be conducted by an evaluation committee consisting of an external expert towards the end of the semester. Each student shall be evaluated for his knowledge and proficiency in the area of study. The evaluation shall be on a maximum of 100 marks, of which 40% is the minimum mark required to pass the Viva-Voce.

### **Seminar:**

To encourage and motivate the students to read and collect recent and reliable information from their area of interest from technical publications including peer reviewed journals (at least 3 in number), conference, books, project reports etc., prepare a report based on a central theme and present it before a peer audience. Each student shall present the seminar for about 20 minutes duration on the selected topic. The report and the presentation shall be evaluated by an expert team based on technical content, style of presentation, adequacy of references, depth of knowledge and overall quality of the report. Submission of a well-prepared Seminar Report duly certified by the Head of Department is mandatory. Seminar shall be evaluated for a maximum of 50 marks, based on assessment by the seminar guide (20 marks) and evaluation by an internal evaluation expert committee (30 marks). The passing criteria is 50% marks of the Continuous Internal Evaluation.

### **Main Project:**

Main Project is prescribed in the fourth semester of the Curriculum. A Project topic must be selected either from research literature or the students themselves may propose suitable topics in consultation with their supervisor(s). Additional supervisors can be selected from Industry/R&D Centre, depending on the nature of the project work. The objective of doing the Main Project is to enable the student to take up investigative study in the broad field of the domain area of study, involving practical work. The work shall be carried out by a single student, under the guidance of Supervisor(s). The evaluation shall be 40 marks as CIE and 60 marks as ESE. There shall be an external expert in the evaluation team to conduct the ESE. Submission of Project Report duly certified by the Head of Department is mandatory to appear for ESE of the course. The passing criteria is 50% marks of the composite evaluation (CIE+ESE) and 40% marks for the ESE.