

## MGM University

### Vision

- To ensure sustainable human development which encourages self-reliant and self-content society.
- To promote activities related to community services, social welfare and also Indian heritage and culture.
- To inculcate the culture of non-violence and truthfulness through vipassanna meditation and Gandhian Philosophy.
- To develop the culture of simple living and high thinking

### Mission

- To impart state of art education and technical expertise to students and give necessary training to teachers to create self-reliant society for future.
- To encourage students to participate in Indian and International activities in sports, literature, etc. so that future generation becomes base for free and liberal society
- To educate students in areas like Management, Finance, Human relations to inculcate philosophy of simple living and high thinking value of simple economic society.
- To inculcate culture of non-violence and truthfulness through Vipassana.

To sustain activities of Indian culture (viz. classical dance, music and fine arts) through establishing institutes like Mahagami, Naturopathy, etc.

## विद्यापीठगीत

अत्तदिपभवभवप्रदिपभव,

स्वरूपरूपभवहो

ज्ञानसब्बविज्ञानसब्बभव ,

सब्बदिपभवहो

अत्ताहिअत्तनोनाथो ,

अत्ताहिअत्तनोगति

अत्तमार्गपरअप्रमादसेहैतुञ्जेचलना

सब्बकाकल्याणहो ,

वोकार्यकुशलकरना

सब्बकाउत्तममंगल , पथप्रदर्शकहो

अत्तदिपभवभवप्रदिपभव ,

स्वरूपरूपभवहो

ज्ञानसब्बविज्ञानसब्बभव ,

सब्बदिपभवहो

बुद्धमंशरनंगच्छामि :

धम्मंशरनंगच्छामि :

संघंशरनंगच्छामि :

## **Dr. G. Y. Pathrikar College of Computer Science & Information Technology.**

MGM college of Computer Science and Information Technology was established in 2001 offering undergraduate and postgraduate degree program in Computer Science and Information Technology. College was renamed as Dr.G.Y.Pathrikar College of Computer Science and Information Technology in 2003 in memory of great educationalist, one of the founder member and Ex-Secretary MGM, Dr.G.Y.Pathrikar Sir.

It is first self-financed ISO certified institution offering program dedicated to Computer science and Information technology in Maharashtra and has achieved status of 2f/12b. Experienced and qualified faculty with Ph.D is strength of our college. Starting with 77 student's College has crossed total students strength of 10,000 passing out. Student are doing well in various MNCs like Infosys, Tech-Mahindra, Wipro, Capgemini, Cognizant etc. Many have their own Startups. Some of the students have completed their Masters and Ph.D. program from foreign countries like US, UK, Australia. Now we are constituent college of MGM University, Chhatrapati Sambhajinagar.

### **Vision**

To be an academic institution in dynamic equilibrium in social, ecological and economical environment striving continuously for excellence in total quality education, research and technological service to the nation.

### **Mission**

- To create and sustain a community of learning in which students acquire knowledge and learn to apply it professionally with due consideration for ethical, and economical issues.
- To upgrade our students in all respect with the help of latest infrastructure in the area of Computer Science and Information Technology in order to build the National Capabilities.
- To understand the culture of Non-violence, truth, peace through Gandhian Philosophy.

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**Programs offered at Dr. G. Y. Pathrikar College of Computer Science & Information Technology**

<b>Undergraduate Programmes</b>	<b>Postgraduate Programmes</b>	<b>PhD Programmes</b>
B.Sc(Computer Science) Honours/ Honours with Research	M.Sc(Computer Science)	Ph.D. in Computer Science and Information Technology
B.Sc(Information Technology) Honours/ Honours with Research	M.Sc(Information Technology)	
BCA(Science) Honours/ Honours with Research	M.Sc(Data Science)	
B.Sc(Animation) Honours/ Honours with Research	M.Sc(Animation)	
Integrated M.Sc. Data Science		
BCA(Digital Marketing)Honours		
B.Sc(Robotics) Honours		

MGMUNIVERSITY

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**Name of Program – BCA (Computer Application) Honours / Honours with Research****Duration – Four Years****Eligibility:**

- He / She Must have passed the Higher Secondary (Multipurpose) Examination conducted by H.S.C. Board Government of Maharashtra with Science / Technical Subjects or an Examination of any statutory University and Board recognized as equivalent thereto.

**OR**

- Candidates having offered prescribed vocational courses, (MCVC) with Computer Techniques / Information Technology / Electronics.

**OR**

- Three Years Course in Diploma Engineering conducted by the Board of Technical Education, Maharashtra State. He / She must have passed at qualifying examination.

MGMUNIVERSITY

**Name of Faculty:** Basics and Applied Science

**Name of the College/Institute/Department/School:** Dr.G.Y Pathrikar College of Computer Science& Information Technology.

**Name of the Programme:** BCA (Computer Application) Honours with Research

**Programme Type (UG/PG):** UG

**Duration:** Four Years

**List of Options to select from Bucket of Courses provided in various categories:**

<b>Major</b>	
<b>Computer Application</b>	
<b>Core Major</b>	<b>Core Elective</b>

<b>Minor options for basic and applied science Faculty</b>	<b>GYP</b>	<b>IBT</b>	<b>UDBAS</b>
	Cyber Security	Food Technology and Processing	Chemistry
	Robotics	Microbiology	Geo-Informatics
	Data Analytics	Biotechnology	Mathematics
	Block-Chain Technologies	Bioinformatics	Statistics
		Food Nutrition and Dietetics	Material Science

<b>Minor options from Other Faculty</b>	<b>Faculty of Engineering and Technology</b>	<b>Faculty of Social Sciences &amp; Humanities</b>	<b>Faculty of Design</b>	<b>Faculty of Management and Commerce</b>	<b>Interdisciplinary Faculty</b>	<b>Performing Arts</b>
	Data Science	Filmmaking	Product Design	Financial Management	Cosmetic Technology	Theatre Arts
	IoT	Photography	Interior Design	E-Commerce	Education	Dance
	Geo-informatics and Applications	Mass Communication and Journalism	Contemporary Arts	International Business Management	Yog Sciences	Music
	EV Technology	Psychology	Visual Communication	Hospitality Mgmt	Physical Education	Folk Art
	Drone Technology	Economics	Fashion Technology	Travel and Tourism	Home Science	
	Robotics Technology	English		Art of Leadership		
	Chemical Technology	Social Work		Art of Business		
	AI&ML					
	Universal Human Values					
	Energy management					

**Name of the Programme:** BCA (Computer Application) Honours with Research

**Programme Type (UG/PG):** UG

**Duration:** Four Years

First Year - Semester I												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML101	Computer Architecture	Theory	2	2		30	20	50	-	08	20
MM	CAS41MML102	C Programming	Theory	2	2		30	20	50	-	08	20
MM	CAS41MMP101	Practical based on Computer System Architecture	Practical	1		2	30	20	50	-	08	20
MM	CAS41MMP102	Practical based on C Programming	Practical	1		2	30	20	50	-	08	20
IKS	CAS41IKL101	Indian Psychology and yoga	Theory	2	2	-	30	20	50	-	08	20
AEC		Basket of AEC From University	Theory	2	2	-	30	20	50	-	08	20
OE		Basket of OE From University	Theory	2	2	-	30	20	50	-	08	20
OE		Basket of OE From University	Theory	2	2	-	30	20	50	-	08	20
VSC	CAS41VSP101	LINUX Operating System	Practical	2		4	30	20	50	-	08	20
SEC	CAS41SEL101	Discrete Mathematics	Theory	2	2	-	30	20	50	-	08	20
VEC		Basket of VEC From University	Theory	2	2	-	30	20	50	-	08	20
CC		Basket of CC From University	Practical	2		4	30	20	50	-	08	20
<b>Total</b>				<b>22</b>	<b>16</b>	<b>12</b>	<b>360</b>	<b>240</b>	<b>600</b>			

**Note:**

**Nature of Course :** L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation, **Course Category:** MM-Major Mandatory, ME-Major Elective, MI-Minor, OE-Generic / Open electives, VSC-Vocational skill course, SEC-Skill Enhancement course, AEC-Ability Enhancement course, IKS-Indian Knowledge system, VEC-Value Education course, OJT-On Job Training / Internship / Apprenticeship, FP-Field project, CEP-Community engagement and service, CC-Co – curricular course, RM-Research methodology, RP-Research project.

First Year - Semester II												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML103	Linear Data Structure	Theory	2	2		30	20	50		08	20
MM	CAS41MML104	Advance C Programming	Theory	2	2		30	20	50		08	20
MM	CAS41MMP103	Practical based on Linear Data Structure	Practical	1		2	30	20	50		08	20
MM	CAS41MMP104	Practical based on Advance C Programming	Practical	1		2	30	20	50		08	20
MI		Basket of MI From University	Theory	2	2	-	30	20	50		08	20
AEC		Basket of AEC From University	Theory	2	2	-	30	20	50		08	20
OE		Basket of OE From University	Theory	2	2	-	30	20	50		08	20
OE		Basket of OE From University	Theory	2	2	-	30	20	50		08	20
VSC	CAS41VSP102	Structural Query Language	Practical	2		4	30	20	50		08	20
SEC	CAS41SEL102	Data Base Management System	Theory	2	2	-	30	20	50		08	20
VEC		Basket of VEC From University	Theory	2	2	-	30	20	50		08	20
CC		Basket of CC From University	Practical	2		4	30	20	50		08	20
<b>Total</b>				<b>22</b>	<b>18</b>	<b>12</b>	<b>390</b>	<b>260</b>	<b>650</b>			

**Note:**

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Second Year - Semester III												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML201	Non Linear Data Structure	Theory	2	2	-	30	20	50		08	20
MM	CAS41MML202	Object Oriented Programming (C++)	Theory	2	2	-	30	20	50		08	20
MM	CAS41MML203	Fundamental of Computer Network	Theory	2	2	-	30	20	50		08	20
MM	CAS41MMP201	Practical Based on Non Linear Data Structure	Practical	1	-	2	30	20	50		08	20
MM	CAS41MMP202	Practical Based on Object Oriented Programming (C++)	Practical	1	-	2	30	20	50		08	20
OE		Basket of OE From University	Theory	2	2	-	30	20	50		08	20
MI		Basket of MI From University	Theory	3	3	-	60	40	100		16	40
MI		Basket of MI From University	Practical	1	-	2	30	20	50		08	20
AEC		Basket of AEC From University	Theory	2	2	-	30	20	50		08	20
VSC	CAS41VSP201	Advance Excel	Practical	2		4	30	20	50		08	20
FP	CAS41FPJ201	Field Project	Project	2		4	30	20	50		08	20
CC		Basket of CC From University	Practical	2		4	30	20	50		08	20
<b>Total</b>				<b>22</b>	<b>13</b>	<b>18</b>	<b>390</b>	<b>260</b>	<b>650</b>			

**Note:**

**Nature of Course :** L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation, **Course Category:** MM-Major Mandatory, ME-Major Elective, MI-Minor, OE-Generic / Open electives, VSC-Vocational skill course, SEC-Skill Enhancement course, AEC-Ability Enhancement course, IKS-Indian Knowledge system, VEC-Value Education course, OJT-On Job Training / Internship / Apprenticeship, FP-Field project, CEP-Community engagement and service, CC-Co – curricular course, RM-Research methodology, RP-Research project

Second Year - Semester IV												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML204	Advance Database Management System	Theory	2	2	-	30	20	50		08	20
MM	CAS41MML205	Web Technologies	Theory	2	2	-	30	20	50		08	20
MM	CAS41MML206	Advance Computer Network	Theory	2	2	-	30	20	50		08	20
MM	CAS41MMP203	Practical Based on Advance Database Management System	Practical	1	-	2	30	20	50		08	20
MM	CAS41MMP204	Practical Based on Web Technologies	Practical	1	-	2	30	20	50		08	20
OE		Basket of OE From University	Theory	2	2	-	30	20	50		08	20
MI		Basket of MI From University	Theory	3	3	-	60	40	100		16	40
MI		Basket of MI From University	Practical	1	-	2	30	20	50		08	20
AEC		Basket of AEC From University	Theory	2	2	-	30	20	50		08	20
SEC	CAS41SEP201	PHP	Practical	2		4	30	20	50		08	20
CEP	CAS41CEP201	Community Engagement Program(As Per University Guidelines)	Practical	2		4	30	20	50		08	20
CC		Basket of CC From University	Practical	2		4	30	20	50		08	20
<b>Total</b>				<b>22</b>	<b>13</b>	<b>18</b>	<b>390</b>	<b>260</b>	<b>650</b>			<b>260</b>

**Note:**

**Nature of Course :** L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation, **Course Category:** MM-Major Mandatory, ME-Major Elective, MI-Minor, OE-Generic / Open electives, VSC-Vocational skill course, SEC-Skill Enhancement course, AEC-Ability Enhancement course, IKS-Indian Knowledge system, VEC-Value Education course, OJT-On Job Training / Internship / Apprenticeship, FP-Field project, CEP-Community engagement and service, CC-Co – curricular course, RM-Research methodology, RP-Research project.

Second Year - Semester V												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML301	Software Project Management	Theory	2	2	-	30	20	50		08	20
MM	CAS41MML302	Core Java	Theory	2	2	-	30	20	50		08	20
MM	CAS41MML303	Data Science	Theory	2	2		30	20	50		08	
MM	CAS41MMP301	Practical Based on Software Project Management	Practical	1	-	2	30	20	50		08	20
MM	CAS41MMP302	Practical Based on Core Java	Practical	1	-	2	30	20	50		08	20
ME	CAS41MEL301	Multidimensional Computer Graphics	Theory	3	3	-	60	40	100		16	40
	CAS41MEL302	Advance PHP for Content Management System										
ME	CAS41MEP301	Pr. Based on Multidimensional Computer Graphics	Practical	1	-	2	30	20	50		08	20
	CAS41MEP302	Pr. Based on Advance PHP for Content Management System										
MI		Basket of MI From University	Theory	3	3	-	60	40	100		16	40
MI		Basket of MI From University	Practical	1	-	2	30	20	50		08	20
VSC	CAS41VSP301	Android Application Development	Practical	2	-	4	30	20	50		08	20
FP	CAS41FPJ301	Field Project	Project	2		4	30	20	50		08	20
<b>Total</b>				<b>20</b>	<b>13</b>	<b>10</b>	<b>390</b>	<b>260</b>	<b>650</b>			<b>280</b>

**Note:**

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Second Year - Semester VI												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML304	Software Project & Agile Development	Theory	2	2	-	30	20	50		08	20
MM	CAS41MML305	Advance JAVA	Theory	2	2	-	30	20	50		08	20
MM	CAS41MML306	Network Security	Theory	2	2	-	30	20	50		08	20
MM	CAS41MMP303	Practical Based on Software Project & Agile Development	Practical	1	-	2	30	20	50		08	20
MM	CAS41MMP304	Practical Based on Advance JAVA	Practical	1	-	2	30	20	50		08	20
ME	CAS41MEL303	AWS DevOps	Theory	3	3	-	60	40	100		16	40
	CAS41MEL304	Data Mining and Visualization										
ME	CAS41MEP303	Practical Based on AWS DevOps	Practical	1	-	2	30	20	50		08	20
	CAS41MEP304	Practical Based on Data Mining and Visualization										
MI		Basket of MI From University	Theory	3	3	-	60	40	100		16	40
MI		Basket of MI From University	Practical	1	-	2	30	20	50		08	20
OJT	CAS41JTP301	On Job Training	Practical	4		8	30	20	50		08	20
<b>Total</b>				<b>20</b>	<b>12</b>	<b>18</b>	<b>360</b>	<b>120</b>	<b>600</b>			

**Note:**

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Fourth Year- Semester VII												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML401	Software Testing and Quality Assurance	Theory	3	3	-	60	40	100		16	40
MM	CAS41MML402	BlockChain Technology	Theory	3	3	-	60	40	100		16	40
MM	CAS41MML403	Python Programming	Theory	3	3	-	60	40	100		16	40
MM	CAS41MMP401	Practical Based on Software Testing and Quality Assurance	Practical	1	-	2	30	20	50		08	20
MM	CAS41MMP402	Practical Based on BlockChain Technology	Practical	1	-	2	30	20	50		08	20
MM	CAS41MMP403	Practical Based on Python Programming	Practical	1	-	2	30	20	50		08	20
ME	CAS41MEL401	Practical Based on React JAVA Script	Theory	3	3	-	60	40	100		16	40
	CAS41MEL402	Practical Based on Frontend Development (ASP.Net, Angular)					60	40	100		16	40
ME	CAS41MEP401	Practical Based on React JAVA Script	Practical	1	-	2	30	20	50		08	20
	CAS41MEP402	Practical Based on Frontend Development (ASP.Net, Angular)					30	20	50		08	20
RM	CAS41RML401	Research Methodology	Theory	3	3	-	60	40	100		16	40
RM	CAS41RMP401	Practical based on Research Methodology	Practical	1	-	2	30	20	50		08	20
Total				20	18	10	450	300	750			

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Fourth Year- Semester VIII												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML404	Machine Learning with Python	Theory	3	3	-	60	40	100		16	40
MM	CAS41MML405	Block chain Platforms	Theory	3	3	-	60	40	100		16	40
MM	CAS41MML406	Biomedical Image Processing	Theory	3	3	-	60	40	100		16	40
MM	CAS41MMP404	Practical Based on Machine Learning with Python	Practical	1	-	2	30	20	50		08	20
MM	CAS41MMP405	Practical Based on Block chain Platforms	Practical	1	-	2	30	20	50		08	20
MM	CAS41MMP406	Practical Based on Biomedical Image Processing	Practical	1	-	2	30	20	50		08	20
ME	CAS41MEL403	Grid & Cloud Computing	Theory	3	3	-	60	40	100		16	40
	CAS41MEL404	Quantum Computing/ Big Data Analytics					60	40	100		16	40
ME	CAS41MEP403	Practical Based on Grid & Cloud Computing	Practical	1			30	20	50		08	20
	CAS41MEP404	Practical Based on Quantum Computing/ Big Data Analytics				2	30	20	50		08	20
OJT	CAS41JTP401	On job Training	Practical	4		8	60	40	100		16	40
<b>Total</b>				<b>20</b>	<b>14</b>	<b>16</b>	<b>420</b>	<b>280</b>	<b>700</b>			

**Note:**

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Fourth Year- Semester VII												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML407	Geospatial Information System	Theory	3	3	-	60	40	100	16		40
MM	CAS41MML408	Signal Processing	Theory	3	1	-	60	40	100	16		40
MM	CAS41MMP406	Practical Based on Geospatial Information System	Practical	1	1	2	30	20	50		08	20
MM	CAS41MMP407	Practical Based on Signal Processing	Practical	1	3	2	30	20	50		08	20
ME	CAS41MEL405	Graphical User Interphase	Theory	3	1	-	60	40	100	16		40
	CAS41MEL406	Biometric technology										
ME	CAS41MEP405	Practical Based on Graphical User Interphase	Practical	1	3	2	30	20	50		08	20
	CAS41MEP406	Practical Based on Biometric technology										
RM	CAS41RML401	Research Methodology	Theory	3	1	-	60	40	100	16		40
	CAS41RMP401	Practical based on Research Methodology	Practical	1	4	2	30	20	50			20
RP	CAS41RPJ401	Research Project	Practical	4	20	8	60	40	100		08	40
Total				20	03	16	420	280	700			

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Fourth Year- Semester VIII												
Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
MM	CAS41MML408	Human Computer Interface	Theory	3	3	-	60	40	100		16	40
MM	CAS41MML409	Biomedical Image Processing	Theory	3	3	-	60	40	100		16	40
MM	CAS41MMP408	Practical Based on Human Computer Interface	Practical	1	-	2	30	20	50		08	20
MM	CAS41MMP409	Practical Based on Biomedical Image Processing	Practical	1	-	2	30	20	50		08	20
ME	CAS41MEL407	Artificial Intelligence	Theory	3	3	-	60	40	100		16	40
	CAS41MEL408	Big Data Analytics										
ME	CAS41MEP407	Practical Based on Artificial Intelligence	Practical	1	-	2	30	20	50		08	20
	CAS41MEP408	Practical Based on Big Data Analytics										
RP	CAS41RPJ402	Research Project	Practical	8		16	120	80	200		32	80
<b>Total</b>				<b>20</b>	<b>14</b>	<b>16</b>	<b>390</b>	<b>260</b>	<b>650</b>	<b>390</b>	<b>260</b>	

**Note:**

**Nature of Course :** L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation, **Course Category:** MM-Major Mandatory, ME-Major Elective, MI-Minor, OE-Generic / Open electives, VSC-Vocational skill course, SEC-Skill Enhancement course, AEC-Ability Enhancement course, IKS-Indian Knowledge system, VEC-Value Education course, OJT-On Job Training / Internship / Apprenticeship, FP-Field project, CEP-Community engagement and service, CC-Co – curricular course, RM-Research methodology, RP-Research project.



## Syllabus

MGMUNIVERSITY

# **SEMESTER-I**

# Semester I

**Course code:** CAS41MML101

**Course name:** Computer Architecture

**Credits:** 2

**Course category:** Major Mandatory

**Pre-requisites:** Basic Knowledge of Computer components.

**Course Objectives:** Student understands the basic structure and operation of a digital computer and various processors.

**Course Outcomes:** At the end of the course, the students will be able to -

**CO1:** Student understands of the basic structure and operation of a digital computer.

**CO2:** To learn the architecture and assembly language Programming of microprocessor.

**CO3:** To study the different Processors.

**Detailed Syllabus:**

UNIT	Topics to be covered	No. of Lect.
A	<p><b>Computer Arithmetic:</b>                      Number System: Decimal System Binary Number System, Hexadecimal Number System. Octal Number System                      Number Conversion: Decimal to Other, Binary to Other, Octal to Other, Hexadecimal to Other, BCD Numbers, ASCII Code, Computer Arithmetic: Addition, Subtraction.</p> <p><b>Logic Gates &amp; Boolean Algebra</b>                      Positive &amp; Negative Logic, Truth Table                      Logic Gates: AND, OR, NOT, NAND, NOR and Exclusive-OR Gate, Universal Gates. Postulates &amp; Theorems of Boolean Algebra (Idempotent, Complementation, Commutative, Associative, Distributive, De-Morgan's Theorem)</p>	10
B	<p><b>Arithmetic Circuits:</b></p> <ul style="list-style-type: none"> <li>➤ <b>Combinational Circuits, Implementing Combinational logic.</b></li> <li>➤ <b>Arithmetic Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor.</b></li> </ul> <p><b>Fundamentals of Microprocessors:</b></p> <ul style="list-style-type: none"> <li>➤ <b>Comparison of 8-bit, 16-bit and 32-bit microprocessor.</b></li> <li>➤ <b>8086 Pin Configuration</b></li> <li>➤ <b>8086 Internal Architectures</b></li> <li>➤ <b>Execution Unit &amp; Bus Interface</b></li> <li>➤ <b>Flag Registers</b></li> <li>➤ <b>Introduction to Addressing Modes</b></li> </ul>	10

<b>C</b>	<p><b>8086 Interrupt and Interrupt Applications:</b></p> <ul style="list-style-type: none"> <li>➤ Interrupts of 8086</li> <li>➤ Hardware Interrupts</li> <li>➤ Software Interrupts</li> </ul> <p><b>Latest Trends in Microprocessor:</b></p> <ul style="list-style-type: none"> <li>➤ RISC and CISC Architectures</li> <li>➤ Design: Multicore Processor and Multicore Processing</li> <li>➤ Multicore Technology and Intel</li> <li>➤ Dual Core and Core Duo Processors</li> <li>➤ Core i3, i5</li> <li>➤ Mobile Processors.</li> </ul>	<b>10</b>
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**Books and References:**

Sr. No.	Title	Author	Publishers	Edition
1.	Digital Electronics: Principles, Devices and Applications	Anil K. Maini	Wiley Publication	
2.	MicroProcessors & Multi core systems	Lyla B Das	Pearson Publication	
3	Microprocessor and Interfacing	Douglas V Hall	Tata McGraw Hill	
4	Digital Design	<i>M. Morris Mano</i>		

**Website Resource:** <https://www.javatpoint.com/computer-organization-and-architecture-tutorial>

# Semester I

**Course code:** CAS41MMP101

**Course name:** Practical Based on Computer Architecture

**Credits:** 1

**Course category:** Major Mandatory

**Pre-requisites:** Basic Knowledge of Computer components.

## Course Objectives:

Student understands of the basic structure and operation of a digital computer and various processors

**Course Outcomes:** At the end of the course, the students will be able to -

**CO1:** Student understands of the basic structure and operation of a digital computer.

**CO2:** To learn the architecture and assembly language Programming of microprocessor.

**CO3:** To study the different Processors.

## Detailed Syllabus:

UNIT	Practical to be covered	No. of Practicals
A	<ol style="list-style-type: none"><li>To Perform Number systems Conversations</li><li>To Perform Binary Arithmetic operations</li><li>To Verify the truth table of Basic Logic Gates</li><li>To Verify the truth table of Universal Logic Gates</li><li>To verify the truth table of Special Purpose Logic Gates.</li></ol>	04
B	<ol style="list-style-type: none"><li>State and Prove Demorgan's Theorem</li><li>To Study and Verify Combinational Logic Circuits (Half adder)</li><li>To Study and Verify Combinational Logic Circuits (Fulladder)</li><li>To Study General Purpose Registers of 8086 Microprocessor</li><li>To Study Special Purpose Registers of 8086 Microprocessor</li></ol>	04
C	<ol style="list-style-type: none"><li>To Study 8086 Pin Diagram and its Functioning</li><li>To Study 8086 Interrupt and its Applications</li><li>To Study Pentium Pro Architecture</li><li>To Analyze and Compare Pentium and Core-i3 Processor</li><li>To Analyze and Compare RISC and CISC Architecture</li></ol>	04

## Books and References:

Sr.No.	Title	Author	Publishers	Edition
1.	Digital Electronics: Principles, Devices and Applications	Anil K. Maini	Wiley Publication	
2.	MicroProcessors & Multi core systems	Lyla B Das	Pearson Publication	
3	Microprocessor and Interfacing	Douglas V Hall	Tata McGraw Hill	

## Website Resources:

1. <https://www.javatpoint.com/computer-organization-and-architecture-tutorial>

# Semester I

**Course code:** CAS41MML102

**Course name:** Introduction to C Programming

**Credits:** 2

**Course category:** Major Mandatory

**Pre-requisites:** Basic of computer application.

## Course Objectives:

To introduce the foundations of computing, programming and problem- solving using C programming language basics.

**Course Outcomes:** At the end of the course, the students will be able to -

CO1: It aims to train the student to the basic concepts of the C programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts.

CO2: The course aims to provide exposure to problem-solving and principles through programming.

CO3: Write the C code for a given algorithm

CO4: Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task

## Detailed Syllabus:

UNIT	Topics to be covered	No. of Lect.
A	<p><b>1. Introduction:</b></p> <p>An Overview of C, History of C language, Features of C.</p> <p><b>2. Basic Elements &amp; Operators</b></p> <ul style="list-style-type: none"><li>• Character set, C Token, Identifier &amp; Keywords, Variables</li><li>• <b>Constant and its types.</b> Integer constant, floating point constant, character constant, string constants.</li><li>• <b>Operators:</b> Binary Operator: Arithmetic, Relational, And Logical, Unary operators: Increment &amp; decrement, Assignment and Conditional operator.</li></ul> <p><b>3. Data Types</b></p> <ul style="list-style-type: none"><li>• Data Types: <i>int, char, float, double</i>. Declaration &amp; Initialization.</li></ul>	10

<b>B</b>	<p><b>4. C Program &amp; I/O statements</b></p> <ul style="list-style-type: none"> <li>• Structure of C Program,</li> <li>• Compilation &amp; Execution of C program</li> <li>• I/O: Introduction, Formatted Input/Output function: <i>scanf()</i> &amp; <i>printf()</i>, Escape sequence characters.</li> </ul> <p><b>5. Control and Iterative Statements:</b></p> <ul style="list-style-type: none"> <li>• Simple if, nested if, if-else, else if ladder</li> <li>• Switch-case statement</li> <li>• The conditional expression (? : operator)</li> </ul> <p><b>Loops:</b></p> <ul style="list-style-type: none"> <li>• while and do-while loop, and for loop</li> <li>• break &amp; continue statement, <i>goto</i> statement</li> </ul>	<b>10</b>
<b>C</b>	<p><b>6. Arrays:</b></p> <ul style="list-style-type: none"> <li>• Introduction, Declaration and initialization</li> <li>• Access in array elements,</li> <li>• Memory representation of array.</li> <li>• One dimension and multi-dimensional arrays,</li> </ul> <p><b>7. Character array, Introduction to string.</b></p> <p><b>String handling functions:</b> <i>strcpy()</i>, <i>strcmp()</i>, <i>strcat()</i>, <i>strlen()</i>, <i>strupr()</i>, <i>strlwr()</i>, <i>gets()</i>, <i>puts()</i></p>	10

**Books and References:**

SR.NO.	Title	Author	Publishers	Edition
1.	Letus C	Y.P.Kanetkar	B pbpublication	
2.	Programming in C	E.Balaburuswamy	TataMacgrawHill	
3.	Programming in C	Goterfried	Shaums' Series	

**Website Resources:**

1. <https://www.w3schools.com/c/>
2. <https://www.javatpoint.com/c-programming-language-tutorial>  
<https://www.geeksforgeeks.org/c-programming-language/>

# Semester I

**Course code:** CAS41MMP102

**Course name:** Practical Based on Introduction to C Programming

**Credits:** 1

**Course category:** Major Mandatory

**Pre-requisites:** Basic of computer application.

**Course Objectives:** To make students understand about the practical implementation of C programs

**Course Outcomes:** After completion of the course the student will be able to:

CO1: It aims to train the student to the basic concepts of the C programming language.

CO2: To understand about syntax of all the basic structures of C programming language.

CO3: Learn to build programs based on various concept to solve real life problems

## Detailed Syllabus:

UNIT	Practical to be covered	No. of Practicals.
A	1. C "Hello, World!" Program 2. C Program to Print an Integer (Entered by the User) 3. C Program to Add Two Integers(Use of operators) 4. C Program to Multiply Two Floating-Point Numbers 5. C Program to Compute Quotient and Remainder	04
B	6. C Program to Check Whether a Number is Even or Odd 7. C Program to Check Whether a Character is a Vowel or Consonant 8. C Program to Find the Largest Number Among Three Numbers 9. C Program to Find Factorial of a Number 10. C Program to Calculate the Power of a Number	04
C	1. C Program to Calculate Average Using Arrays 2. C Program to Find Largest Element in an Array 3. C Program to Add Two Matrices Using Multi-dimensional Arrays 4. C Program to Find Transpose of a Matrix 5. C program to demonstrate various string handling functions	04

## Books and References:

SR.NO.	Title	Author	Publishers	Edition
1.	Letus C	Y.P.Kanetkar	Bpb publication	
2.	Programming in C	E.Balaburuswamy	Tata MacgrawHill	
3.	Programming in C	Goterfried	Shaums'Series	



# Semester I

**Course code:** CAS41VSP101

**Course name:** LINUX Operating System

**Credits:** 2

**Course category:** Vocational Skill Course

**Pre-requisites:** Basic of operating system functionality

**Course Objectives:** Introduce modern operating systems basic concepts and commands to work with.

**Course Outcomes:** After completion of the course the student will be able to:

**CO1:** Understand and make use of linux command for working with shell

**CO2:** Understand, apply utilities commands that are essential while working with linux operating system.

**CO3:** Gain knowledge of linux file system and associated commands.

## Detailed Syllabus:

UNIT	Practical to be covered	No. of Practicals.
A	<b>WORKING WITH SHELL</b> 1. Identify the running shell (related commands) 2. Correcting mistakes (related commands) 3. Repeating/Editing command line (related commands) 4. Finding documentation (related commands) 5. Getting help with the system (related commands)	04
B	<b>UTILITIES</b> 6. Basic utilities (List the names of file, display a text file, delete a file, display a text file one screen at a time, display system name) 7. Working with files (commands associated with files) 8. Compressing and archiving files 9. Locating commands 10. Obtaining user information, system information, 11. Communicating with other users	04
C	<b>FILE SYSTEM</b> 12. Working with directories (commands associated with directory) 13. Access permissions (commands associated with access permissions) 14. Access Control Lists (commands associated with ACLs) 15. Hard links (commands associated with hard links) 16. Symbolic links (commands associated with symbolic links)	04

**Books and References:**

<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publishers</b>	<b>Edition</b>
1.	A Practical Guide to Linux Commands, Editors, and Shell Programming.	Mark G. Sobel	Prentice Hall	Second
2.	Linux For Beginners: The Ultimate Guide To The Linux Operating System & Linux	Adam Vardy		
3.	Linux: The Ultimate Step by Step Guide to Quickly and Easily Learning Linux	Ted Dawson		
4.	Guide to Operating Systems	Greg Tomsho	Cengage Learning	Fifth

**Website Resources:**

1. <https://www.redhat.com/sysadmin/linux-skills-home-lab>

# Semester I

**Course code:** CAS41SEL101

**Course name:** Discrete Mathematics

**Credits:** 2

**Course category:** Skill Enhancement Course

**Pre-requisites:** Basic of mathematics

**Course Objectives:** Capable to understand Combinations, Propositional function, statements and well-formed formulas; to understand and handle the concept of Set theory; able to understand the concept of Relations and its types; to understand various concepts in graphs and trees

**Course Outcomes:** After completion of the course the student will be able to:

- CO1: Know how to represent various statements using set, relations, functions, permutations and combinations, groups, graphs and trees
- CO2: Use logical notations to formulate and reason about fundamental Mathematical concepts such as sets, relations, functions and algebraic structures
- CO3: Analyse the growth of functions and real world problems using various concepts like recurrence relations, graph implementation etc.

## Detailed Syllabus:

UNIT	Topics to be covered	No. of Lect.
A	<p><b>Set Theory:</b></p> <ul style="list-style-type: none"><li>○ Types of Set: Finite, Infinite, Singleton, Empty, Subset, Proper Subset, Universal Set, Power Set</li><li>○ Venn Diagram</li><li>○ Operations on Set: Union of Sets, Intersection of Sets, Complement of Set</li><li>○ Cartesian Product</li><li>○ Difference and Symmetric Difference of Set</li><li>○ Principle of Inclusion and Exclusion for two sets</li><li>○ Principle of Inclusion and Exclusion for three sets</li></ul> <p><b>Combinatory:</b></p> <ul style="list-style-type: none"><li>○ Permutation and Combination</li><li>○ Mathematical Induction- Pigeonhole principle</li></ul>	10

<b>B</b>	<p><b>UNIT-II</b> <b>Relations:</b></p> <ul style="list-style-type: none"> <li>○ Basic definitions of Relation</li> <li>○ Types of Relations</li> <li>○ Graph of Relations</li> <li>○ Properties of Binary Relations</li> <li>○ Matrix Representation of Relations</li> <li>○ Operations on Relations</li> <li>○ Partition and Covering</li> <li>○ Transitive Closure</li> <li>○ Partial Ordering Relations.</li> </ul>	<b>10</b>
<b>C</b>	<p style="text-align: center;"><b>UNIT-III</b></p> <p><b>Basics of Graph Theory and Tree:</b></p> <ul style="list-style-type: none"> <li>○ Introduction to Graph</li> <li>○ Application of Graph</li> <li>○ Finite and Infinite Graph</li> <li>○ Incidence and Degree</li> <li>○ Null Graph</li> <li>○ Isolated and Pendent Vertex, Isomorphism</li> <li>○ Union and Intersection Operations on Graph</li> <li>○ Subgraph, Planner Graph</li> <li>○ Walks, Path and Circuit</li> <li>○ Introduction to Trees</li> <li>○ Pendant Vertices on Tree</li> <li>○ Binary Tree</li> <li>○ Spanning Tree</li> </ul>	<b>10</b>

**Books and References:**

Sr.No.	Title	Author	Publishers	Edition
1.	Elements of Discrete Mathematics-A Computer Oriented Approach	C. L Liu, D.P.Mohapatra	TataMcGrawHill	3rdedition
2.	Discrete Mathematics and its Applications With Combinatorics and Graph Theory	K.H.Rosen	TataMcGrawHill	7thEdition
3.	Discrete Mathematical Structures with Applications to Computer Science	J.P.Tremblay,R.Manohar	TataMcGrawHill, India	1stEdition
4.	Discrete Mathematical Structures	BernandKolman, Roberty C. Busby,SharnCutterRos s	PearsonEduc ation/PHI	
5.	Foundations of Computer Science	A.AhoandJ.Ullma n	W.H.Freeman	

## Semester II

Course code: CAS41MML103

Course name: Linear Data Structures

Credits: 2

Course category: Major Mandatory

**Pre-requisites:** Basic of computer Programming and aware about data.

**Course Objectives:** Student get familiar with the basic concepts of data structures and algorithms, Get familiar with basic techniques of algorithms. Student get familiar with basic concepts about stacks, queues, lists, and hence student able to implement practically searching techniques.

**Course Outcomes:** After completion of the course the student will be able to:

CO1: Ability to implement and use linear data structures, including stacks, queues, lists.

CO2: Understand of basic terminology data, data item, fields and data structures.

CO3: Understand and analyze the concepts of arrays.

Detailed Syllabus:

UNIT	Topics to be covered	No. of Lect.
A	<b>Introduction Design of Algorithm in Data Structure:</b> <ul style="list-style-type: none"><li>• Definition of data and meaning of Algorithm</li><li>• Definition of data structure, classification and types of data structure,</li><li>• Basic Terminology: Data item, Fields, Records, Files, Entity, and Attributes.</li></ul> <b>Arrays</b> <ul style="list-style-type: none"><li>• Representation of Linear Arrays</li><li>• Operations on Array-Traversing, Insertion and Deletions.</li><li>• Searching an element</li><li>• Multidimensional Arrays: 2D &amp; M-D Concept</li></ul>	10
B	<b>Stack:</b> <ul style="list-style-type: none"><li>• Working of stack</li><li>• Operations on stack</li><li>• Array Representation of stack,</li><li>• Linked representation of stack,</li><li>• Algorithm for Insertion and deletion of an element</li><li>• Searching an element</li><li>• Application of stacks.</li></ul> <b>Queue:</b> <ul style="list-style-type: none"><li>• Working of queue</li><li>• Operations on queue</li><li>• Representation of queues &amp; link.</li><li>• Algorithm for insertion and deletion of an element</li><li>• Searching an element</li><li>• Dequeue: representation, insertion and deletion of an element</li><li>• Priority Queue: representation, insertion and deletion of an element.</li></ul>	10

<b>C</b>	<p><b>Linked List</b></p> <ul style="list-style-type: none"> <li>• Concept of linked list</li> <li>• Representation of linked list in memory</li> <li>• Traversing a linked list</li> <li>• Insertion of an element</li> <li>• Deletion of an element in linked list</li> <li>• Types of linked list</li> <li>• Header Linked List, Two way Linked List</li> </ul>	<b>10</b>
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**Books and References:**

<b>Sr.No.</b>	<b>Title</b>	<b>Author</b>	<b>Publishers</b>	<b>Edition</b>
1.	Fundamentals of Data structures	Horowitz&Sahani	Galgotiapublication	
2.	Introduction to Algorithms	ThomasH.Cormen,CharlesE.Leise rson,RonaidL.Rivest, CliffordStein	PHIPublication	
3.	Data Structures	Tannenbaum	PHIpublication	

## Semester II

Course code: CAS41MMP10

Course name: Practical based on Linear Data Structures

Credits: 1

Course category: Major Mandatory

**Pre-requisites:** Basic Knowledge of Computer components.

**Course Objectives:** Practically, student get familiar with the basic concepts of data structures and algorithms, Get familiar with basic techniques of algorithms. Student get familiar with basic concepts about stacks, queues, lists, and hence student able to implement practically searching techniques.

**Course Outcomes:** At the end of the course, the students will be able to –

CO1: Ability to implement and use linear data structures, including stacks, queues, lists.

CO2: Understand of basic terminology data, data item, fields and data structures

CO3: Understand and analyse the concepts of arrays

CO4: Apply the concepts of linked list, Linked representation of Queue for specified applications.

### Detailed Syllabus:

UNIT	Practical to be covered	No. of Practicals.
A	<b>Introduction Design of Algorithm in Data Structure &amp; Arrays</b> <ol style="list-style-type: none"><li>1. W. P. in C to calculate the no. of letters in a word.</li><li>2. W. P. in C to calculate the no. of words in a sentence.</li><li>3. Implement algorithm for Traversing of Linear Array.</li><li>4. Implement algorithm for insert new element in to Array.</li><li>5. Implement algorithm for delete element from the Array.</li></ol>	04
B	<b>Stack and Queue:</b> <ol style="list-style-type: none"><li>6. Write a Program in C to find Prime numbers between 1 to1000numbers.</li><li>7. Implement algorithm for Traversing of Stack.</li><li>8. Implement algorithm for PUSH new element into stack by algorithm.</li><li>9. Implement algorithm for POP element from the Stack by algorithm.</li><li>10. Implement algorithm for linear Search by algorithm.</li></ol>	04
C	<b>Linked List:</b> <ol style="list-style-type: none"><li>1. Implement algorithm for Traversing of Linked List.</li><li>2. Implement algorithm for insert new element into Array.</li><li>3. Implement algorithm for delete element from the Array.</li><li>4. Write a Program in C for interchange the place word1 with word2.</li><li>5. Implement algorithm for traversing of Header Linked List or Two way Linked List</li></ol>	04

**Books and References:**

<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publishers</b>	<b>Edition</b>
1.	Fundamentals of Data structures	Horowitz & Sahani	Galgotia publication	
2.	Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein	PHI Publication	
3.	Data Structures	Tannenbaum	PHI publication	



## Semester II

**Course code:** CAS41MML104

**Course name:** Advanced C Programming

**Credits:** 2

**Course category:** Major Mandatory

**Pre-requisites:** Basic Knowledge of Computer components.

**Course Objectives:** Practically, student get familiar with the basic concepts of data structures and algorithms, Get familiar with basic techniques of algorithms. Student get familiar with basic concepts about stacks, queues, lists, and hence student able to implement practically searching techniques.

**Course Outcomes:** At the end of the course, the students will be able to -

CO1: The course aims to provide exposure to problem-solving and principles through programming.

CO2: It aims to train the student to the basic concepts of the C programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts

CO3: Write the C code for a given algorithm.

CO4: Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task

### Detailed Syllabus:

UNIT	Topics to be covered	No. of Lect.
A	<p style="text-align: center;"><b>1. Functions</b></p> <p>Introduction, Defining functions, Arguments, Function prototype, actual parameters and formal parameters, Calling function, Returning function results,</p> <p>Types of functions Function with no argument and no return type Function with argument and no return type Function with no argument and return type Function with argument and return type Recursion.</p> <p style="text-align: center;"><b>2. Preprocessor Directives:</b></p> <p>File inclusion and conditional compiler directives, Macros substitution, #define, #if, #ifdef, #else, #elif, #endif</p>	<b>10</b>

<b>B</b>	<p style="text-align: center;"><b>3. Structure &amp; Union</b></p> <p><b>Structure:</b> Introduction, Declaration and initializing structure, Accessing structure members, Nested structures, Arrays of structure, <i>type def</i> statement.</p> <p><b>Unions:</b> Declaration, Difference between structure and union</p> <p style="text-align: center;"><b>4. Pointers:</b></p> <p>Introduction, Memory organization. Declaration and initialization of pointers. The pointer operator * and &amp;, De-referencing, Pointer expression and pointer arithmetic</p>	<b>15</b>
<b>C</b>	<p><b>5. File Handling</b></p> <p>Introduction, Opening &amp; closing a file, Input/Output operations on files, text and binary files, getc() ,putc() function. File copy program, fprintf() and fscanf(). fread() and fwrite() function.</p> <p>Writing and reading records from binary file, Appending, modifying and deleting a record from file, Random access functions fseek(), rewind(), flushall(), remove(), rename()</p>	<b>15</b>

**Books and References:**

SR.NO.	Title	Author	Publishers	Edition
1.	LetusC	Y.P.Kanetkar	bpbpublication	
2.	Programming in C	E.Balaburuswamy	TataMacgrawHill	
3.	Programming in C	Goterfried	Shaums' Series	

**Website Resources:**

1. <https://www.w3schools.com/c/>
2. <https://www.javatpoint.com/c-programming-language-tutorial>
3. <https://www.geeksforgeeks.org/c-programming-language/>

## Semester II

**Course code:** CAS41MMP104

**Course name:** Practical based on Advanced C Programming

**Credits:** 1

**Course category:** Major Mandatory

**Pre-requisites:** Basic Knowledge of Computer components.

**Course Objectives:** student get familiar with the basic concepts of data structures and algorithms, Get familiar with basic techniques of algorithms. Student get familiar with basic concepts about stacks, queues, lists, and hence student able to implement practically searching techniques.

**Course Outcomes:** At the end of the course, the students will be able to -

CO1: The course aims to provide exposure to problem-solving and principles through programming.

CO2: It aims to train the student to the basic concepts of the C programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts

CO3: Write the C code for a given algorithm.

CO4: Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task

### Detailed Syllabus:

UNIT	Practical to be covered	No.of Practicals.
A	<ol style="list-style-type: none"><li>1. C Program to Check Prime or Armstrong Number Using User-defined Function</li><li>2. C Program to Reverse a Sentence Using Recursion</li><li>3. C programs based on Preprocessor directives</li><li>4. C program to calculate the power using recursion</li><li>5. C programs based on Preprocessor directives</li></ol>	04
B	<ol style="list-style-type: none"><li>1. C Program to Store Information of a Student Using Structure</li><li>2. C Program to Add Two Distances (ininch-feetsystem) using Structures</li><li>3. C Program to Calculate Difference Between Two Time Periods</li><li>4. Program to demonstrate Unions.</li><li>5. Program to demonstrate pointers.</li></ol>	04
C	<ol style="list-style-type: none"><li>1. Program to demonstrate file handling</li><li>2. C Program to Write a Sentence to a File</li><li>3. C Program to Read theFirstLineFromaFile</li><li>4. C ProgramtoDisplayitsownSourceCodeasOutput</li><li>5. C programtousevariousfilehandlingfunctions</li></ol>	04

### Books and References:

SR.NO.	Title	Author	Publishers	Edition
1.	LetusC	Y.P.Kanetkar	bppublication	
2.	ProgramminginC	E.Balaburuswamy	TataMacgrawHill	
3.	ProgramminginC	Goterfried	Shaums'Series	

### Website Resources:

1. [https://www.tutorialspoint.com/computer\\_fundamentals/computer\\_applications.htm](https://www.tutorialspoint.com/computer_fundamentals/computer_applications.htm)
2. <https://www.programiz.com/c-programming/examples>  
<https://www.geeksforgeeks.org/c-programming-examples/>

## Semester II

Course code: CAS41VSP102

Course name: Structured Query Language

Credits: 2

Course category: Vocational skill course

Pre-requisites: Basic Knowledge of Computer Programming

Course Objectives: To understand the concept of Database management system

Course Outcomes: At the end of the course, the students will be able to -

CO1: Ability to implement and use database structures, including creation, Insertion, Deletion of table.

CO2: Understand of basics of database management.

CO3: Understand and analyze data for programming

UNIT	Practical to be covered	No.of Practicals.
A	<ul style="list-style-type: none"><li>o Design and draw E-Rdiagrams</li><li>o Study of3-Levelarchitecture</li><li>o Study ofMySQL</li><li>o Download andInstallXamppserverforMySQL</li><li>o Creating a new user account and a database Creating schem as for the database</li></ul>	04
B	<ul style="list-style-type: none"><li>o Studyofbasic operations DDLcommands</li><li>o StudyofDML commands</li><li>o StudyofDCL commands</li><li>o StudyofConstraints:Rule 1&amp;2,advancedconstraintslike primary key, foreign key, unique and check constraints ontableswithexamples</li><li>o Write&amp;executequeriesusingselectcommandusingwhere ,groupby,orderbyandhavingclauses.</li></ul>	04
C	<ul style="list-style-type: none"><li>o Study of Basic Operations of Relational Algebra with examples (Union, Intersection, difference &amp; Cartesian Product)</li><li>o Study of Selection and Projection Operations with examples</li><li>o StudyofJoin(natural,Inner,outer,left&amp;right)andDivision Operationswithexamples</li><li>o Study of Single Row Functions with examples Study of conversion functions with examples.</li></ul>	04

Web site Resources:1.<https://www.redhat.com/sysadmin/linux-skills-home-lab>

## Semester II

**Course code:** CAS41SEL102

**Course name:** Database Management System

**Credits:** 2

**Course category:** Skill Enhancement Course

**Pre-requisites:** Basic Knowledge of Computer Programming

**Course Objectives:** To understand the concept of Database management system

**Course Outcomes:** At the end of the course, the students will be able to -

CO1: Recognize and understand the basic concepts of database, knowledge, classifications of Architecture of database, Database users, define advantages of database.

CO2: Describe the components of data base system, define transaction, data modeling

CO3: Draw E-Rdiagram, schema diagram, classify attributes.

### Detailed Syllabus:

UNIT	Topics to be covered	No. of Lect.
A	<p><b>Introduction to basic concepts of DBMS:</b></p> <ul style="list-style-type: none"> <li>o Database System Application</li> <li>o Purpose of Database System</li> <li>o DatabaseArchitecture:3-Levelarchitecture</li> <li>o Database Users &amp; Administrators Responsibilities</li> <li>o Functional Components of Database system: Storage&amp;</li> <li>o Query Processor</li> <li>o Transaction Management</li> </ul>	10
B	<p><b>Data Modeling&amp; Design:</b></p> <ul style="list-style-type: none"> <li>o Type of Data Model:               <ul style="list-style-type: none"> <li>o Relation Data Model</li> <li>o E-R Data Model</li> <li>o Object Based Data Model</li> <li>o Semi-Structured Data Model</li> <li>o Hierarchical &amp; Network Data Model</li> </ul> </li> </ul> <p><b>E-R Data Model:</b></p> <ul style="list-style-type: none"> <li>o Entity,Entityset,Entitytypes,Attributes,TypesofAttributes,E-Rdiagram.</li> <li>o Mapping Cardinalities, Data Association</li> <li>o Constraints: Integrity constraints I&amp;II</li> <li>o Database Design: OverviewofDesignProcess,DesigningPhase,Normalization(1NF,2NF,3NF)</li> </ul>	10

<b>C</b>	<b>Relational Data Model</b> <ul style="list-style-type: none"> <li>○ Basic Structure</li> <li>○ Database Schema</li> <li>○ Integrity Rules</li> <li>○ E.F.Codds Rules</li> <li>○ Relational Algebra: Union, Intersection, Difference, Cartesian Product, Selection, Projection, Join: Natural &amp; Outer Join, Division</li> <li>○ Trigger, Stored procedure with advantages and disadvantages</li> </ul>	10
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**Books and References:**

Sr.No	Title	Author	Publishers	Edition
1.	Database System concepts	Korth,Siberschatz		Fifth
2.	An Introduction to Database System	B.Desai		Revised

**Website Resources:** 1.<https://www.javatpoint.com/dbms-tutorial>