

**CURRICULUM**  
**BACHELOR OF SCIENCE(HONS.) COMPUTER SCIENCE**  
**CHOICE BASED CREDIT SYSTEM**

**STUDENTS LEARNING OUTCOMES**

The curriculum and syllabi for Bachelor of Science(Hons.) Computer Science program (2017-18) conform to Outcome Based Education (OBE) for a flexible and structured Choice Based Credit System (CBCS). In general, **ELEVEN STUDENT OUTCOMES** (a-k) have been identified and the curriculum and syllabi have been chosen in such a way that each of the modules meets one or more of these outcomes. Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program. Further, each module in the program spells out clear instructional objectives which are mapped to the student outcomes.

**The Student Outcomes are:**

- (a) Ability to apply knowledge of Mathematical Foundations in computing problems.
- (b) Ability to understand the Software concepts and their applications.
- (c) Ability to practice and develop software for interpretation and analysis of data.
- (d) Ability to use the techniques, skills, and modern Software tools necessary for software Development.
  
- (e) Ability to identify and analyze software problems in multiple aspect including coding, testing and implementation in industrial applications.
- (f) Ability to design, develop and verify a software system to meet desired needs ensuring its reliability and security in addition to satisfying economic, social and ethical constraints.
- (g) Ability to apply Enterprise level application software for design of engineering product/process.
- (h) Ability to function as consultant for the development of sustainable software solutions.
- (i) An understanding of professional and ethical values.
- (j) Ability to communicate effectively in diverse groups and exhibit leadership skills.
- (k) To develop an understanding of global environment and its protection.

**BACHELOR OF SCIENCE (HONS.) COMPUTER SCIENCE  
SUMMARY OF PROGRAM CURRICULUM**

Category		Total Number of Credits [B.Sc.(Hons.) CS]	Min Required Credits [B.Sc.(Hons.) CS]	Percentage of Total credits
<b>General</b>	<b>G</b>	<b>4</b>	<b>2</b>	<b>3%</b>
[B.Sc.(Hons.) CS]	Program Core (PC)	84	84	
	Program Elective (PE)	30	30	
	Generic Elective (GE)	24	20	
	Project (PD)	6	6	
<b>Total [B.Sc.(Hons.) CS]</b>		<b>144</b>	<b>140</b>	<b>85%</b>
<b>Mangement</b>	<b>M</b>	<b>4</b>	<b>4</b>	<b>3%</b>
Professional Enrichment (P)	Ability Enhancement (AE)	10	9	
	Skill Enhancemet (SE)	2	2	
	Creativity & Innovation (CI)	1	0	
	Co-Curricular Activity (CA)	1	0	
<b>Total Professional Enrichment</b>		<b>14</b>	<b>11</b>	<b>9%</b>
<b>Overall Total</b>		<b>166</b>	<b>157</b>	<b>100%</b>

**Note:**

Students are to earn at least 157 credits out of 166 credits to become eligible for the award of B.Sc.(Hons.)Comp. Science degree.

**B.Sc.(Hons.) Computer Science  
PROGRAM SCHEME**

SEMESTER I								MARKS		
MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
ENGL0103	P	AE	ENGLISH COMMUNICATION	2	0	0	2	40	60	100
CSEN0112		PC	PROGRAMMING FUNDAMENTALS USING C/C++	4	0	0	4	40	60	100
CSEN0113		PC	PROGRAMMING FUNDAMENTALS USING C/C++ LAB	0	0	4	2	15	35	50
CSEN0110		PC	COMPUTER SYSTEM ARCHITECTURE	4	0	0	4	40	60	100
CSEN0111		PC	COMPUTER SYSTEM ARCHITECTURE LAB	0	0	4	2	15	35	50
		GE	GE-I	4	0	0	4	40	60	100
		GE	GE-I LAB	0	0	4	2	15	35	50
	G		FOREIGN LANGUAGE PART-I #	2	0	0	2	25	50	75
<b>TOTAL CREDITS</b>				<b>16</b>	<b>0</b>	<b>12</b>	<b>22</b>	<b>TOTAL MARKS</b>		<b>625</b>

**# FOREIGN LANGUAGE**

One foreign language out of the following

- L = Lecture  
T = Tutorial  
P = Practical  
C = Credit Point

MODULE CODE	MODULE NAME
LANF0101	French
LANG0102	German
LANS0103	Spanish

SEMESTER II								MARKS		
MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
ENVS0102	P	AE	ENVIRONMENTAL SCIENCE	2	0	0	2	40	60	100
CSEN0133		PC	PROGRAMMING IN JAVA	4	0	0	4	40	60	100
CSEN0134		PC	PROGRAMMING IN JAVA LAB	0	0	4	2	15	35	50
CSEN0132		PC	DISCRETE STRUCTURES	4	2	0	6	50	100	150
		GE	GE-II	4	0	0	4	40	60	100
		GE	GE-II LAB	0	0	4	2	15	35	50
	G		FOREIGN LANGUAGE PART-II <sup>#</sup>	2	0	0	2	25	50	75
<b>TOTAL CREDITS</b>				<b>16</b>	<b>2</b>	<b>8</b>	<b>22</b>	<b>TOTAL MARKS</b>		<b>625</b>

L = Lecture

T = Tutorial

P = Practical

C = Credit Point

<sup>#</sup> FOREIGN LANGUAGE

One foreign language out of the following

MODULE CODE	MODULE NAME
LANF0101	FRENCH
LANG0102	GERMAN
LANS0103	SPANISH

SEMESTER III								MARKS		
MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
COAP2120		PC	DATA STRUCTURES	4	0	0	4	40	60	100
COAP2121		PC	DATA STRUCTURES LAB	0	0	4	2	15	35	50
COAP2122		PC	OPERATING SYSTEMS	4	0	0	4	40	60	100
COAP2123		PC	OPERATING SYSTEMS LAB	0	0	4	2	15	35	50
COAP2124		PC	COMPUTER NETWORKS	4	0	0	4	40	60	100
COAP2125		PC	COMPUTER NETWORKS LAB	0	0	4	2	15	35	50
		GE	GE-III	4	0	0	4	40	60	100
		GE	GE-III LAB	0	0	4	2	15	35	50
		PE	SEC-I	2	0	0	2	40	60	100
		PE	SEC-I LAB	0	0	2	1	15	35	50
COAP2126		PD	SPECIALIZED MINOR PROJECT (GROUP)	0	0	2	1	50		50
VALU0119		AE	APTITUDE I	2	0	0	2	25	50	75
<b>TOTAL CREDITS</b>				<b>20</b>	<b>0</b>	<b>20</b>	<b>30</b>	<b>TOTAL MARKS</b>		<b>875</b>

L = Lecture

T = Tutorial

P = Practical

C = Credit Point

SEMESTER IV								MARKS		
MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
COAP2127		PC	DESIGN AND ANALYSIS OF ALGORITHMS	4	0	0	4	40	60	100
COAP2128		PC	DESIGN AND ANALYSIS OF ALGORITHMS LAB	0	0	4	2	15	35	50
COAP2129		PC	SOFTWARE ENGINEERING	4	0	0	4	40	60	100
COAP2130		PC	SOFTWARE ENGINEERING LAB	0	0	4	2	15	35	50
COAP2131		PC	DATABASE MANAGEMENT SYSTEM	4	0	0	4	40	60	100
COAP2132		PC	DATABASE MANAGEMENT SYSTEM LAB	0	0	4	2	15	35	50
		GE	GE IV	4	0	0	4	40	60	100
		GE	GE IV LAB	0	0	4	2	15	35	50
		PE	SEC-II	2	0	0	2	40	60	100
		PE	SEC-II LAB	0	0	2	1	15	35	25
VALU0123		SE	PROFESSIONAL COMMUNICATION-I	2	0	0	2	25	50	75
ENGL0109		AE	ACADEMIC WRITING	0	0	2	1	25		25
<b>TOTAL CREDITS</b>				<b>20</b>	<b>0</b>	<b>20</b>	<b>30</b>	<b>TOTAL MARKS</b>		<b>825</b>

L = Lecture

T = Tutorial

P = Practical

C = Credit Point

SEMESTER V								MARKS		
MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
COAP3120		PC	INTERNET TECHNOLOGIES	4	0	0	4	40	60	100
COAP3121		PC	INTERNET TECHNOLOGIES LAB	0	0	4	2	15	35	50
COAP3122		PC	THEORY OF COMPUTATION	4	2	0	6	50	100	150
		PE	DSE-I	4	0	0	4	40	60	100
		PE	DSE-I LAB	0	0	4	2	15	35	50
		PE	DSE-II	4	0	0	4	40	60	100
		PE	DSE-II LAB	0	0	4	2	15	35	50
COAP3123		PD	SPECIALIZED MAJOR PROJECT (GROUP) ##	0	0	4	2	50		50
COAP3124			INDUSTRIAL TRAINING I (Training to be undergone after IV semester)	0	0	2	1	25		25
	P	CI	CREATIVITY AND INNOVATION/ ACADEMIC WRITING #	0	0	0	1	25		25
CLUB0101	P	CA	CO-CURRICULAR ACTIVITY	0	0	0	1	25		25
	P	AE	YOGA/NCC/NSS*	0	0	2	1	25		25
VALU0136	P	AE	APTITUDE II	2	0	0	2	25	50	75
<b>TOTAL CREDITS</b>				<b>18</b>	<b>2</b>	<b>20</b>	<b>32</b>	<b>TOTAL MARKS</b>		<b>825</b>

L = Lecture

T = Tutorial

P = Practical

C = Credit Point

### ELECTIVES

MODULE CODE	MODULE NAME	MODULE CODE	MODULE NAME
	CREATIVITY AND INNOVATION	VALU0118	YOGA
ENGL0110	ACADEMIC WRITING	VALU0121	NCC
		VALU0122	NSS

SEMESTER VI								MARKS		
MODULE CODE	CATEGORY	SUB-CATEGORY	MODULE	L	T	P	C	INTERNAL	EXTERNAL	TOTAL
COAP3125		PC	ARTIFICIAL INTELLIGENCE	4	0	0	4	40	60	100
COAP3126		PC	ARTIFICIAL INTELLIGENCE LAB	0	0	4	2	15	35	50
COAP3127		PC	COMPUTER GRAPHICS	4	0	0	4	40	60	100
COAP3128		PC	COMPUTER GRAPHICS LAB	0	0	4	2	15	35	50
		PE	DSE-III	4	0	0	4	40	60	100
		PE	DSE-III LAB	0	0	4	2	15	35	50
		PE	DSE-IV	4	0	0	4	40	60	100
		PE	DSE-IV LAB	0	0	4	2	15	35	50
MGMT0103		M	ENTREPRENEURSHIP	4	0	0	4	40	60	100
COAP3129		PD	SPECIALIZED MAJOR PROJECT (INDIVIDUAL) <sup>##</sup>	0	0	4	2	40	60	100
<b>TOTAL CREDITS</b>				<b>20</b>	<b>0</b>	<b>20</b>	<b>30</b>	<b>TOTAL MARKS</b>		<b>800</b>

L = Lecture

T = Tutorial

P = Practical

C = Credit Point

<b>General Elective(GE 1 to GE 4)</b>					
<b>Mathematics &amp; Tutorial</b>					
<b>SI.NO.</b>	<b>MODULE CODE</b>	<b>SUBJECT NAME</b>	<b>CREDITS</b>	<b>INTERNAL MARKS</b>	<b>EXTERNAL MARKS</b>
1	MATH1301	Finite Element Methods & Tutorial	6	50	100
2	MATH1302	Mathematical Finance & Tutorial	6	50	100
3	MATH1303	Applications of Algebra & Tutorial	6	50	100
4	MATH1304	Combinational Mathematics & Tutorial	6	50	100
5	MATH1305	Econometrics& Tutorial	6	50	100
6	MATH1306	Information Security& Tutorial	6	50	100
<b>Physics &amp; Lab</b>					
<b>SI.NO.</b>	<b>MODULE CODE</b>	<b>SUBJECT NAME</b>	<b>CREDITS</b>	<b>INTERNAL</b>	<b>EXTERNAL</b>
1	PHYS1301	Mechanics	4	40	60
2	PHYS1302	MechanicsLab	2	15	35
3	PHYS1303	Electricity & Magnetism	4	40	60
4	PHYS1304	Electricity & MagnetismLab	2	15	35
5	PHYS2301	Thermal Physics	4	40	60
6	PHYS2302	Thermal PhysicsLab	2	15	35
7	PHYS2303	Waves & Optics	4	40	60
8	PHYS2304	Waves & OpticsLab	2	15	35
9	PHYS2305	Digital, Analog & Instrumentation	4	40	60
10	PHYS2306	Digital, Analog & InstrumentationLab	2	15	35
11	PHYS2307	Embedded Systems	4	40	60
12	PHYS2308	Embedded SystemsLab	2	15	35
<b>Chemistry &amp; Lab</b>					
<b>SI.NO.</b>	<b>MODULE CODE</b>	<b>SUBJECT NAME</b>	<b>CREDITS</b>	<b>INTERNAL MARKS</b>	<b>EXTERNAL MARKS</b>
1	CHEM1101	Atomic Structure, Bonding & General Organic Chemistry-I	4	40	60
2	CHEM1102	Atomic Structure, Bonding & General Organic ChemistryLab	2	15	35
3	CHEM1103	Chemical Energetics	4	40	60
4	CHEM1104	Chemical EnergeticsLab	2	15	35
5	CHEM2101	Conductance, Electro-chemistry & Functional Group Organic Chemistry-II	4	40	60

6	CHEM2102	Conductance, Electro-chemistry & Functional Group Organic Chemistry-II Lab	2	15	35
7	CHEM2103	Transition Metal Chemistry	4	40	60
8	CHEM2104	Transition Metal Chemistry Lab	2	15	35
9	CHEM2105	Organometallic Chemistry & Bioinorganic Chemistry	4	40	60
10	CHEM2106	Organometallic Chemistry & Bioinorganic Chemistry Lab	2	15	35
11	CHEM2107	Molecules of Life	4	40	60
12	CHEM2108	Molecules of Life Lab	2	15	35
13	CHEM2109	Chemistry of Main Group Elements	4	40	60
14	CHEM2110	Chemistry of Main Group Elements Lab	2	15	35

Skill Enhancement Courses-(SEC1 to SEC2)					
SI.NO.	MODULE CODE	SUBJECT NAME	CREDITS	INTERNAL MARKS	EXTERNAL MARKS
1	COAP4201	HTML Programming	2	40	60
2	COAP4202	HTML Programming Lab	2	15	35
3	COAP4203	Programming with VB	2	40	60
4	COAP4204	Programming with VB Lab	2	15	35

Discipline Specific Elective Papers( DSE 1 TO DSE4)					
SI.NO.	MODULE CODE	SUBJECT NAME	CREDITS	INTERNAL MARKS	EXTERNAL MARKS
1	COAP4205	Advanced Java	4	40	60
2	COAP4206	Advanced Java Lab	2	15	35
3	COAP4207	.Net Technology	4	40	60
4	COAP4208	.Net Technology Lab	2	15	35
5	COAP4209	Advanced Database Management System	4	40	60
6	COAP4210	Advanced Database Management System Lab	2	15	35
7	COAP4211	Unix & Shell Programming	4	40	60
8	COAP4212	Unix & Shell Programming Lab	2	15	35

<b>9</b>	COAP4213	Advanced System Administration	4	40	60
<b>10</b>	COAP4214	Advanced System Administration Lab	2	15	35
<b>11</b>	COAP4215	Android Programming	4	40	60
<b>12</b>	COAP4216	Android Programming Lab	2	15	35
<b>13</b>	COAP4217	Python Programming	4	40	60
<b>14</b>	COAP4218	Python Programming Lab	2	15	35
<b>15</b>	COAP4219	Data Mining	4	40	60
<b>16</b>	COAP4220	Data Mining Lab	2	15	35
<b>17</b>	COAP4221	Software Testing	4	40	60
<b>18</b>	COAP4222	Software Testing Lab	2	15	35
<b>19</b>	COAP4223	Soft Computing	4	40	60
<b>20</b>	COAP4224	Soft Computing Lab	2	15	35

**Note: Universities may include more options**