



## *TYL Courses*

## 1. Tie Your LACES (TYL)

<b>Name of the experts or faculty member/s identified to train students with their specializations</b>	<p>Sachin Gudimani - Quantitative Aptitude</p> <p>Logeashwaran M - Logical Reasoning Aptitude</p> <p>Merin John - Verbal Aptitude</p> <p>Alpha Benny - Verbal Aptitude</p> <p>Mouna Muthamma C P - Soft Skills</p> <p>Vidya.U - Python</p> <p>Akhilaa - Python</p> <p>Bineet Kumar Jha - Python</p> <p>Dr. M.Farida Begam - Python</p> <p>Devisivashankari - Python</p> <p>Ms. Varsha P - Java</p> <p>Ms. Kavitha S N - Java</p> <p>Ms. Ashwini Doke - Java</p> <p>Mr. Bineet Kumar Jha - Java</p> <p>Ms. Akhilaa - Java</p> <p>Akhilaa - C/C++</p>
<b>Name of the person in-charged with Mob. no. and E-mail id</b>	<p>Lakshman Malla</p> <p>Mobile: 98450 27392</p> <p>Email: director.placement@cmrit.ac.in</p>
<b>The contents taught within the syllabus</b>	<p>Nil</p>
<b>The contents taught beyond the syllabus</b>	<p>Aptitude</p> <ul style="list-style-type: none"> <li>Quantitative Aptitude</li> <li>Logical Reasoning</li> <li>Verbal Ability</li> </ul> <p>Soft Skills</p> <ul style="list-style-type: none"> <li>Presentation and Communication Skills</li> <li>Team Interaction</li> <li>Resume writing and portfolio presentation</li> <li>Group Discussion</li> <li>Personal Interviews</li> </ul> <p>Python/Java/C Programming</p> <ul style="list-style-type: none"> <li>Write complex programs</li> <li>Write defined programs in Hackerearth</li> <li>Writing workflow diagrams to program solution</li> <li>Competitive Programming</li> <li>Continuous assessment and feedback mechanism</li> </ul>

<b>Where are the desirable outcomes? (learning that students would be getting)</b>	<p><b>Aptitude</b></p> <ul style="list-style-type: none"> <li>• Strong thinking capability</li> <li>• Problem solving attitude</li> <li>• Strong Verbal Ability</li> <li>• Proficiency in English language</li> </ul> <p><b>Soft Skills</b></p> <ul style="list-style-type: none"> <li>• Ability to participate in Group Discussion and Personal Interviews</li> <li>• Prepare professional resumes</li> <li>• Communicate Effectively</li> <li>• Working in Teams</li> <li>• Adopt Professionalism</li> <li>• Conflict Management</li> <li>• Self-Analysis and Goal setting</li> </ul> <p><b>Software Programming</b></p> <ul style="list-style-type: none"> <li>• Mastering Programming Languages</li> <li>• Proficiency in Python/Java/C programming</li> <li>• Ability to do projects in Python/Java/C</li> </ul>
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- TYL (Tie Your LACES) program on Language, Aptitude, Core (Programming – P1 to P5, Core domain – C2 to C5), Experiential and Soft-skills
- Fundamentals of Programming P2
- Python – for all branches P3, P4
- JAVA – additional for CSE/ISE/ECE/EEE/MCA P3, P4
- C++ – additional for CSE/ISE/ECE/EEE P3, P4
- Cloud/Big Data/Full Stack/Machine Learning – Certifications/Competitions P5
- Core Concepts & Fundamentals – for all branches C2, C3, C4, C5

All TYL topics are categorized into: - Lx for Language skills, Ax for Aptitude skills, Cx for Core domain skills, Px for Programming skills, Sx for Soft skills, Tx for Tools skills and Bx for Business Skills. Lx, Ax, Cx, Px and Sx are applicable to BE, MCA and M.Tech courses, whereas Bx and Tx apply to MBA course.

All TYL Skills are developed in students from first year to final year in phases. For example, TYL A1 Aptitude is covered in first year BE, where TYL A2 & A3 Aptitude trainings are planned in 5th & 6th semesters of BE. Similarly, Px topics are covered with TYL P1-Basics in 1st year BE, TYL P2-Python and P2-Advanced in BE 2nd year and TYL P3, P4, P5 trainings are planned in 3rd year. TYL program is designed such that skill levels go up as students' progress in their coursework.

#### **For TYL related queries you can contact**

- Test Owner for any queries on the test
- Test Results Owner for any queries on the test results

TYL Owners			
Sem	TYL Topic	Owner	Test Results Owner
7	C5-Odd	HoD	HoD
8	C5-Even/C5-Full		
5	C4-Odd		
6	C4-Even/C4-Full		
4	C3-Even/C3-Full		
1&2	C2-Physics/ Chemistry		
5	A2-Aptitude,	T&P Director (director.placement@cmrit.ac.in)	Prof. Simant (simant.k@cmrit.ac.in) Prof. Sachin (sachin.g@cmrit.ac.in)
6	A3-Aptitude		
1&2	A1-Aptitude		
5	S2-Soft Skills,	T&P Director (director.placement@cmrit.ac.in)	Prof. Mouna (mouna.m@cmrit.ac.in)
6	S3-Soft Skills		
5	P3-Python	Prof. Gomathi for Java (hod.mca@cmrit.ac.in) Prof. Farida for Python (farida.b@cmrit.ac.in)	HoD/FPC
6	P3-Java		
6	P4-Java/Python		
6	P5-CS/FS/DA/ML	Prof. Gomathi for P5-CS (hod.mca@cmrit.ac.in)	HoD/FPC
		Prof. Farida for P5-FS (farida.b@cmrit.ac.in)	
		Prof. Kavitha for P5-BDA, ML (kavitha.p@cmrit.ac.in)	
4	L3-English	T&P Director (director.placement@cmrit.ac.in)	Prof. Merin (merin.j@cmrit.ac.in) or
			Prof. Princy (princy.j@cmrit.ac.in)
4	P3-Java for CS/IS	Prof. Gomathi for P5-CS (hod.mca@cmrit.ac.in)	HoD/FPC
4	P2-Advanced	Prof. Kavitha (kavitha.p@cmrit.ac.in)	HoD/FPC
3	P2-Python	Prof. Farida (farida.b@cmrit.ac.in)	HoD/FPC
3	P2-C for CS/IS	Prof. Kavitha (kavitha.p@cmrit.ac.in)	HoD/FPC
1 & 2	P1-Basics with C	Prof. Kavitha (kavitha.p@cmrit.ac.in)	HoD

MCA	5	P4-Java	Prof. Gomathi ( <a href="mailto:hod.mca@cmrit.ac.in">hod.mca@cmrit.ac.in</a> )	HoD/FPC
		P4-Full Stack		
	4	P3-Java		
		P3-Full Stack		
	1	P2-Java		
		P2-Full Stack		
	3	P4-Python	Prof. Farida	HoD/FPC
	2	P3-Python	( <a href="mailto:farida.b@cmrit.ac.in">farida.b@cmrit.ac.in</a> )	
	5	C4-Odd/C4-Full	HoD	HoD
	4	C3-Even/C3-Full		
	2	C3-Even/C3-Full		
	1	C3-Odd		
	04-Feb	A3-Aptitude	T&P Director ( <a href="mailto:director.placement@cmrit.ac.in">director.placement@cmrit.ac.in</a> )	Prof. Simant ( <a href="mailto:simant.k@cmrit.ac.in">simant.k@cmrit.ac.in</a> )
	03-Jan	A2-Aptitude		Prof. Sachin ( <a href="mailto:sachin.g@cmrit.ac.in">sachin.g@cmrit.ac.in</a> )
	04-Feb	S3-Soft Skills	T&P Director ( <a href="mailto:director.placement@cmrit.ac.in">director.placement@cmrit.ac.in</a> )	Prof. Mouna
	1	S2-Soft Skills		( <a href="mailto:mouna.m@cmrit.ac.in">mouna.m@cmrit.ac.in</a> )
MBA	3	A3-Aptitude	T&P Director ( <a href="mailto:director.placement@cmrit.ac.in">director.placement@cmrit.ac.in</a> )	Prof. Simant ( <a href="mailto:simant.k@cmrit.ac.in">simant.k@cmrit.ac.in</a> ) Prof. Sachin ( <a href="mailto:sachin.g@cmrit.ac.in">sachin.g@cmrit.ac.in</a> )
	3	S3-Soft Skills	T&P Director ( <a href="mailto:director.placement@cmrit.ac.in">director.placement@cmrit.ac.in</a> )	Prof. Mouna ( <a href="mailto:mouna.m@cmrit.ac.in">mouna.m@cmrit.ac.in</a> )
	2	S2-Soft Skills		
	1	S1-Soft Skills		
	3	B3-Business Domain	HoD	HoD/FPC
	2	B2-Business Domain		
	1	B1-Business Domain		
	3	T3-Job Specific	HoD	HoD/FPC
	2	T2-Excel		

M.Tech	3	A3-Aptitude	T&P Director ( <a href="mailto:director.placement@cmrit.ac.in">director.placement@cmrit.ac.in</a> )	Prof. Simant ( <a href="mailto:simant.k@cmrit.ac.in">simant.k@cmrit.ac.in</a> ) Prof. Sachin ( <a href="mailto:sachin.g@cmrit.ac.in">sachin.g@cmrit.ac.in</a> )
	2	A3-Aptitude		
	3	S3-Soft Skills	T&P Director ( <a href="mailto:director.placement@cmrit.ac.in">director.placement@cmrit.ac.in</a> )	Prof. Mouna ( <a href="mailto:mouna.m@cmrit.ac.in">mouna.m@cmrit.ac.in</a> )
	2	S2-Soft Skills		
	3	P4-Java	Prof. Gomathi ( <a href="mailto:hod.mca@cmrit.ac.in">hod.mca@cmrit.ac.in</a> )	HoD/FPC
	3	P4-Python	Prof. Farida ( <a href="mailto:farida.b@cmrit.ac.in">farida.b@cmrit.ac.in</a> )	HoD/FPC
	2	P3-Python		
	2	P2-Advanced	Prof. Kavitha ( <a href="mailto:kavitha.p@cmrit.ac.in">kavitha.p@cmrit.ac.in</a> )	HoD/FPC
	3	P5-CS/FS/DA/ML	Prof. Gomathi for P5-CS ( <a href="mailto:hod.mca@cmrit.ac.in">hod.mca@cmrit.ac.in</a> )	HoD/FPC
			Prof. Farida for P5-FS ( <a href="mailto:farida.b@cmrit.ac.in">farida.b@cmrit.ac.in</a> )	
			Prof. Kavitha for P5-BDA,ML ( <a href="mailto:kavitha.p@cmrit.ac.in">kavitha.p@cmrit.ac.in</a> )	
	1	P2-Python	Prof. Farida ( <a href="mailto:farida.b@cmrit.ac.in">farida.b@cmrit.ac.in</a> )	HoD/FPC
		P3-Java	Prof. Gomathi ( <a href="mailto:hod.mca@cmrit.ac.in">hod.mca@cmrit.ac.in</a> )	

### For your information

- Cx tests are being conducted by individual departments
- Px tests are being conducted by specific Px owners
- Ax, Sx & Lx tests are being conducted by T&P

### Similarly

- Cx results are maintained by Department HoDs
- P2, P3, P4, P5 results are maintained by Department HoDs/FPCs
- P1 results are maintained by BS HoDs
- Ax, Sx & Lx results are maintained by T&P

Students can contact respective test owners or test results owners for related queries as mentioned in attached table:



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Bangalore 560037, India

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E: [info@cmrit.ac.in](mailto:info@cmrit.ac.in)





**CMR Institute of Technology**  
**Bengaluru**

**Tie Your LACES (TYL)**  
**Syllabus Book**  
**October 2021**

**Training and Learning Program**



## **TYL SYLLABUS**

### **TYL Program Objectives**

- To enhance the chances of the placement of students at campus, by preparing them better to face the selection process with confidence.
- To enhance the thinking and reasoning capabilities of students
- To build confidence in students by imparting them the ability to learn new concepts and techniques with ease.
- To make students ready for the real world by equipping them with contemporary and future skills.
- To build professionalism among students

### **TYL Skill Areas**

1. Language – (Lx)
2. Aptitude – (Ax)
3. Core – (Px-Core Programming, Cx- Core Academic)
4. Experiential
5. Soft Skills – (Sx)

### **Aptitude Subjects**

1. A1 – Aptitude Basics
2. A2 – Aptitude-2
3. A3 – Aptitude-3

### **Soft Skills Subjects**

1. S1 – Soft Skills-1
2. S2 – Soft Skills-2
3. S3 – Soft Skills-3

### **Px Programming Subjects**

1. P1 – Basics with C
2. P2 – Python and DB
3. P2 – Data Structure with C
4. P2 – Advanced Concepts
5. P3 – Python Programming
6. P3 – Java Programming
7. P4 – Proficiency in Python
8. P4 – Proficiency in Java
9. P5 – Full Stack Development
10. P5 – Big Data Analytics
11. P5 – Cloud Computing
12. P5 – Machine Learning with Python

**CMR Institute of Technology, Bengaluru**  
**TYL Scheme of Teaching and Examination**  
**(Effective from the academic year 2021-22)**

Sem	Subject		Skills	Delivery	Model	Target Depts	TYL-No of Hours per Week		TYL-Examination				TYL Credits
	Code	Name					Theory	Practical	Duration	IA	Exam	Total	
1 or 2	20TYLP1BA	Basics with C	Prog	VTU	Classroom	All	0	2	1.5	40	60	100	1
3	20TYLP2PY	Python and DB	Prog	TYL	Classroom	All	1	2	1.5	40	60	100	2
3	20TYLP2C	Data Structures with C	Prog	VTU	Classroom	CSE/ISE	0	2	1.5	40	60	100	1
4	20TYLP2AD	Advanced Concepts	Prog	TYL	Classroom	All	3	0	1	40	60	100	2
5	20TYLP3PY	Python Programming	Prog	TYL/VTU	Self / Doubt-clearance sessions	All	0	2	1.5	40	60	100	1
6	20TYLP3JA	Java Programming	Prog	VTU	Lab	All	0	2	1.5	40	60	100	1
5 or 6	20TYLP4JA	Proficiency in Java	Prog	TYL	Self / Doubt-clearance sessions	All	0	2	1	0	100	100	1
5 or 6	20TYLP4PY	Proficiency in Python	Prog	TYL	Self / Doubt-clearance sessions	All	0	2	1	0	100	100	1
6 or 7	20TYLP5FS	Full Stack Development (Self-paced)	Prog	TYL	Videos/ Doubt-clearance sessions	All	0	4	0.5	0	100	100	2
6 or 7	20TYLP5CC	Cloud Computing (Self-paced)	Prog	TYL	Videos/ Doubt-clearance sessions	All	0	2	0.5	0	100	100	1
6 or 7	20TYLP5BD	Big Data Analytics (Self-paced)	Prog	TYL	Videos/ Doubt-clearance sessions	All	0	4	0.5	0	100	100	2
6 or 7	20TYLP5ML	Machine Learning with Python (Self-paced)	Prog	TYL	Videos/ Doubt-clearance sessions	All	0	4	0.5	0	100	100	2
1 or 2	18TYLA1	Aptitude Basics	Aptitude	TYL	Classroom	All	2	0	1	40	60	100	2
5	18TYLA2	Aptitude-2	Aptitude	TYL	Classroom	All	3	0	1	40	60	100	3
6	18TYLA3	Aptitude-3	Aptitude	TYL	Classroom	All	3	0	1	40	60	100	3
1 or 2	18TYLS1	Soft Skills-1	Soft Skills	TYL	Classroom	All	1	0	0	100	0	100	1
5	18TYLS2	Soft Skills-2	Soft Skills	TYL	Classroom	All	1	0	0	100	0	100	1
6	18TYLS3	Soft Skills-3	Soft Skills	TYL	Classroom	All	1	0	0	100	0	100	1

**Note: VTU Delivery - the subject is delivered concurrently with the corresponding VTU subject.**  
**TYL Delivery - the subject is delivered as an independent TYL subject.**

<b>TYL P1- BASICS with C</b> <b>(Effective from the academic year 2020-2021)</b> <b>SEMESTER-I</b>			
<b>Course Code</b>	<b>20TYLP1BA</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Contact Hours/Week</b>	<b>2 hours Practical</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Contact Hours</b>	<b>24</b>	<b>Exam Hours</b>	<b>1.5 hours</b>
<b>CREDITS –1</b>			
<b>Course Learning Objectives:</b> This course will enable students to			
<ul style="list-style-type: none"> <li>➤ Apply programming constructs of C language to solve the real-world problems</li> <li>➤ Implement different programming constructs by decomposing the problems into functions.</li> <li>➤ Explore user-defined data structures like arrays, structures and pointers in implementing solutions to problems</li> <li>➤ Define and use pointers with simple applications</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Computer basics:</b> Algorithms and flowchart, Introduction to Computer Hardware and Software, Generation/ History. Computer fundamentals - CPU, Memory, Input, Output, Hardware, Software, Machine Language, Network devices, Tutorial - Basic OS(Linux) commands, Introduction to Problem Solving, Program Development Life cycle, Pseudo code, Flowchart, Algorithm, Formulating Test cases			<b>4</b>
<b>Module 2</b>			
<b>Basic programming:</b> Getting started with C, Basic structure of C program, Code, Compile and run, Constant, Keywords, Variables and Data Types. Operators and Expressions, Type conversion, Precedence of operators & Associativity, Managing input and output operations, getchar(), putchar(), gets(), puts(), printf(), scanf(), Format specifiers / Control strings ,Example programs, Conditional Statements, Decision structures			<b>5</b>
<b>Module 3</b>			
<b>Conditional Branching Loops:</b> Case control structure, switch, switch vs if else ladder, Example programs, looping structures-for, while, break, continue, do-while, Example Programs using looping structures			<b>5</b>
<b>Module 4</b>			
<b>Arrays, Strings:</b> Arrays,1-D and 2-D arrays, Array initialization, Array elements in memory, Example Programs, <b>Strings:</b> standard library string functions, Example programs, <b>sorting algorithms-</b> Bubble sort, Selection Sort, Example programs, <b>Searching algorithms</b> - Linear search, Binary search, Example programs			<b>5</b>
<b>Module 5</b>			
<b>Functions &amp; Recursion:</b> Functions, Categories: Built-in functions & User defined functions, Parameters/Arguments, actual and formal arguments Example programs, Recursion & Example Programs, Passing arrays as arguments in functions, <b>Pointers Structures:</b> Structures, Introduction of structures & unions with declaration & initialization, Accessing structure members, Array of structures, Nested structure, Example programs & lab experiments, Uses / application of structures, Pointers, Introduction to pointers, Arrays & pointers, Pointer arithmetic, Pointers as arguments in			<b>5</b>

functions, Example Programs & Lab experiments, Pre-processor directives.	
<b>Course Outcomes:</b> Upon completion of this course, students can:	
<ol style="list-style-type: none"> <li>1. Design algorithms and draw flowcharts for solving mathematical and computational problems.</li> <li>2. Explore user-defined data structures like structures, unions and pointers in implementing solutions</li> <li>3. Design and develop solutions to problems using modular programming constructs such as functions.</li> <li>4. Understand the concept of pointer-arithmetic and apply the same.</li> </ol>	
<b>Question Paper Pattern and Evaluation method:</b>	
<b>Internal Tests (50 Marks):</b> <ul style="list-style-type: none"> <li>• 5 MCQ type questions (5 marks)</li> <li>• 1-2 flowchart questions (10 marks)</li> <li>• 1-2 error correction questions (5 marks)</li> <li>• 2-3 programming questions (30 marks)</li> </ul> <b>Final Exam (50 marks):</b> <ul style="list-style-type: none"> <li>• 5 MCQ type questions (5 marks)</li> <li>• 1-2 flowchart questions (10 marks)</li> <li>• 1-2 error correction questions (5 marks)</li> <li>• 2-3 programming questions (30 marks)</li> </ul> <b>Evaluation Method:</b> <ul style="list-style-type: none"> <li>• 2 Internal Assessment Tests (IAT) and one final test will be conducted.</li> <li>• IAT1 - 20 marks, IAT2 - 20 marks and Final Test - 60 marks. Students must score 50% in all tests and overall, 50% is the minimum passing mark.</li> </ul>	
<b>Textbooks:</b>	
<ol style="list-style-type: none"> <li>1. E. Balagurusamy, Programming in ANSI C, 7<sup>th</sup> Edition, Tata McGraw-Hill</li> <li>2. Brain W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, Prentice Hall of India</li> </ol>	
<b>Reference Books:</b>	
<ol style="list-style-type: none"> <li>1. Sumitabha Das, Computer Fundamentals &amp; C Programming, Mc Graw Hill Education</li> </ol>	

<b>TYL P2 – Python and DB</b> <b>(Effective from the Academic Year 2020 -2021)</b> <b>SEMESTER – III</b>			
<b>Course Code</b>	<b>20TYLP2PY</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Contact Hours/Week</b>	<b>1 hour Theory + 2 hours Practical</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Contact Hours</b>	<b>36</b>	<b>Exam Hours</b>	<b>1.5 Hours</b>
<b>CREDITS – 2</b>			
<b>Course Learning Objectives:</b> This course will enable students to <ul style="list-style-type: none"> <li>➤ Explain the fundamentals of programming using Python</li> <li>➤ Illustrate how to create and use of modules, packages in programming</li> <li>➤ Demonstrate the object-oriented programming concepts</li> <li>➤ Make right choices regarding Data Structure during application development.</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Introduction:</b> Importance of Programming, Problem Solving, representation, Programming Languages, Variables and Operators, Implicit/Explicit Type conversions, Decision Constructs, Iteration Control structures (for, while)-break-continue-pass, Strings			<b>7</b>
<b>Module 2</b>			
<b>Collections and Function:</b> Lists, Tuples, Sets & Dictionary, Defining & calling a function, passing arguments, Mutable & Immutable data types, Types of argument, scope of a variable, Recursive functions, try, except, try...finally, Handling exception in code			<b>7</b>
<b>Module 3</b>			
<b>Modules and Packages, Libraries and Files:</b> Modules and Packages, Random Library, Math Library, String functions, List functions, Dictionary functions, Date and Time functions, File Handling			<b>7</b>
<b>Module 4</b>			
<b>Object Oriented Programming:</b> Creating classes, Instance variables & access specifiers, methods and complete python program, importance of self, __init__() method, instance method, class method and static method, using default parameters in methods			<b>6</b>
<b>Module 5</b>			
<b>Introduction to Data Structures, Linear and Non-Linear Data structures:</b> Introduction to List, List using Array – Operations, List using Linked List – Introduction- Operations – Stack – Operations – Applications, Queue – Operations – Applications, Graphs, Tree			<b>9</b>
<b>Course Outcomes:</b> The students will be able to			
1. Examine Python syntax and semantics and confident enough to the use of Python control flow structures and functions. 2. Code, test, debug and manipulate Simple Python programs 3. Handle exceptions and working with files 4. Create solutions using object-oriented paradigm and data structures			
<b>Question Paper Pattern and Evaluation Method</b>			
<ul style="list-style-type: none"> <li>• Two tests along with 1 &amp; 2 IATs (Code snippet based MCQs) will be conducted and the</li> </ul>			

<p>scores will be scaled to 40 as CIE.</p> <ul style="list-style-type: none"> <li>• Final test will be conducted along with 3rd IAT (Code snippet based MCQs) will be conducted scores will be scaled to 60 as SEE.</li> <li>• Minimum passing percentage: 50%</li> </ul>
<b>Textbooks:</b>
<ol style="list-style-type: none"> <li>1. Allen B. Downey, Think Python: How to Think Like a Computer Scientist, 2nd Edition, Green Tea Press, 2015</li> <li>2. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, Data Structures and Algorithms in Python, 1<sup>st</sup> Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978- 8126562176</li> </ol>
<b>Reference Books and Web References:</b>
<ol style="list-style-type: none"> <li>1. Wesley J Chun, Core Python Applications Programming, 3<sup>rd</sup> Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365</li> <li>2. <a href="https://infytq.infosys.com/">https://infytq.infosys.com/</a></li> <li>3. <a href="https://www.geeksforgeeks.org/python-programming-examples/">https://www.geeksforgeeks.org/python-programming-examples/</a></li> <li>4. <a href="https://www.geeksforgeeks.org/data-structures/">https://www.geeksforgeeks.org/data-structures/</a></li> </ol>

**TYL P2 - Data Structures with C**  
**(Effective from the academic year 2020-2021)**  
**SEMESTER-III**

<b>Course Code</b>	<b>20TYLP2C</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Contact Hours/Week</b>	<b>2 hours Practical</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Contact Hours</b>	<b>24</b>	<b>Exam Hours</b>	<b>1.5 hours</b>

**CREDITS –1**

**Course Learning Objectives:** This course will enable students to

- Explain fundamentals of data structures and their applications essential for programming/problem solving.
- Illustrate linear representation of data structures: Stack, Queues, Lists, Trees and Graphs.
- Model the solution to a given problem using data structures and algorithms.

<b>Modules</b>	<b>Contact Hours</b>
<b>Module 1</b>	
<b>Basics of C Programming:</b> Operators and Expressions, branching statements, Loops, Decision structures, Functions & recursion, Passing arrays as arguments in functions. <b>Introduction:</b> Primitive and non-Primitive Data structure, Review of Arrays, Structures, Self-Referential Structures, and Unions. Pointers and Dynamic Memory Allocation Functions. Representation of Linear Arrays in Memory, dynamically allocated arrays.	<b>5</b>
<b>Module 2</b>	
<b>Arrays:</b> Array operations, types, 1-D,2-D arrays, <b>Strings:</b> Basic Terminology, Storing, Operations and Pattern Matching algorithms, Programming Examples, sorting algorithms, searching algorithms, Representing Stack, Queue using Arrays, Programming examples	<b>5</b>
<b>Module 3</b>	
<b>Linked Lists:</b> Definition, Representation of linked lists in Memory, Memory allocation; Garbage Collection. Linked list operations: Traversing, Searching, Insertion, and Deletion. Doubly Linked lists, Circular linked lists, and header linked lists. Linked Stacks and Queues. Applications of Linked list, Programming examples.	<b>5</b>
<b>Module 4</b>	
<b>Binary Trees:</b> Properties of Binary trees, Array and linked Representation of Binary Trees, Binary Tree Traversals - Inorder, postorder, preorder; Additional Binary tree operations. Threaded binary trees, <b>Binary Search Trees</b> – Definition, Insertion, Deletion, Traversal, Searching, Application of Trees-Evaluation of Expression, Programming Examples.	<b>5</b>
<b>Module 5</b>	
<b>Graphs:</b> Definitions, Terminologies, Matrix and Adjacency List, Representation of Graphs, Elementary Graph operations, Traversal methods: Breadth First Search and Depth First Search, Programming Examples, <b>Hashing</b> and collision resolution techniques.	<b>4</b>

**Course Outcomes:** The students will be able to

1. Modularize a given problem using functions and structures
2. Apply concepts of C programming in implementing data structures
3. Construct a programming solution to the given problem using C by selecting suitable data

structures

4. Model a given problem/scenario in terms of data-structures needed and algorithms / methods useful to solve / analyse it.

#### **Question Paper Pattern and Evaluation method:**

The question paper will have four programming questions (two –easy level and two- medium level).

- Each easy level programming question carries 20 marks
- Each medium level programming question carries 30 marks

#### **Evaluation method:**

- 2 Internal assessment tests (IAT) and one final test will be conducted
- IAT1 - 20 marks, IAT2 - 20 marks and Final Test - 60 marks. Students must score 50% in all tests and overall, 50% is the minimum passing mark.

#### **Textbooks:**

1. E. Balagurusamy Programming in ANSI C, 7<sup>th</sup> Edition, Tata McGraw-Hill
2. Brain W. Kernighan and Dennis M. Ritchie, The 'C' Programming Language, Prentice Hall of India
3. Horowitz, Sahni, Anderson-Freed: Fundamentals of Data Structures in C, 2nd Edition, Universities Press, 2007.

#### **Reference Books:**

1. Sumitabha Das, Computer Fundamentals & C Programming, McGraw Hill Education, 2018
2. Richard F. Gilberg and Behrouz A. Forouzan, Data Structures A Pseudo Code Approach with C, Cengage Learning, 2005.



**TYL P2 - Advanced Concepts**  
**(Effective from the academic year 2020-2021)**  
**SEMESTER-IV**

<b>Course Code</b>	<b>20TYLP2AD</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Contact Hours/Week</b>	<b>3 hours Theory</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Contact Hours</b>	<b>36</b>	<b>Exam Hours</b>	<b>1 hour</b>

**CREDITS – 2**

**Course Learning Objectives:** This course will enable students to

- Understand the basic subsystems of a computer, their organization, operation, Operating system and peripherals
- Understand the fundamentals of data structures and algorithms essential for problem solving
- Understand the concepts of data models, technology and practices.
- Explore data communication and various types of computer networks and protocols

<b>Modules</b>	<b>Contact Hours</b>
<b>Module 1</b>	
<b>Computer Organization and Peripherals:</b> Central processing unit (CPU), Memory, I/O subsystem, and bus, CPU, Memory, Hard disk, Common Interfaces <b>Peripherals:</b> Input, output and storage devices <b>Programming and Data Structures:</b> Programming in C, Recursion, Arrays, Stacks, Queues, Linked lists, Trees, Binary trees and binary search trees, Binary heaps, Graphs	<b>7</b>
<b>Module 2</b>	
<b>Operating System:</b> Processes, Threads, Inter-process communication, Concurrency and synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems	<b>6</b>
<b>Module 3</b>	
<b>Databases:</b> ER-model, Relational model: relational algebra, tuple calculus, SQL Integrity constraints, Normal forms, File organization, Indexing (e.g., B and B+ trees), Transactions and concurrency control	<b>7</b>
<b>Module 4</b>	
<b>Algorithms:</b> Searching, Sorting, Hashing, Asymptotic worst-case time and space complexity, Algorithm design techniques: Greedy approach, dynamic programming, divide-and-conquer, Graph search: Depth first search (DFS), Breadth first search (BFS), Minimum spanning trees, shortest paths	<b>8</b>
<b>Module 5</b>	
<b>Computer Networks:</b> Concept of layering, LAN technologies (Ethernet), Data Link Layer, Flow and error control techniques, Switching IPv4/IPv6, Routers and routing algorithms (distance vector, link state) TCP/UDP and sockets, Congestion control, Application layer protocols (DNS, SMTP, POP, FTP, HTTP) Basics of Wi-Fi, Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls	<b>8</b>

**Course Outcomes:** The students will be able to

1. Understand the functioning of different subsystems, such as processor, Input/output, and memory, OS and peripherals
2. Use different data structures, operations and estimate the computational complexity of

different algorithms.

3. Identify, analyse and define data models, enforce integrity constraints on a database using RDBMS.
4. Familiarize themselves with Network protocols and functions of various layers

#### **Question Paper Pattern and Evaluation method:**

##### **Internal Tests:**

- 2 tests will be conducted with multiple choice questions (MCQs)

##### **Final Test:**

- The question paper will have more practical oriented and level-3 (L3) type of multiple-choice questions (MCQs)

##### **Evaluation Method**

- 2 Internal assessment tests (IAT) and one final test will be conducted.
- IAT1 - 20 marks, IAT2 - 20 marks, and Final Test - 60 marks. Students must score 50% in all tests and overall, 50% is the minimum passing mark

#### **Text Books:**

1. Ellis Horowitz and Sartaj Sahni, Fundamentals of Data Structures in C, 2nd Edition, Universities Press, 2014.
2. Ellis Horowitz, Sartaj Sahni and Rajasekaran, Computer Algorithms/C++, 2nd Edition, Universities Press 2014,
3. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, Operating System Principles 7th edition, Wiley-India, 2006
4. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems. 7th Edition, Pearson, 2017
5. James F Kurose and Keith W Ross, Computer Networking, A Top-Down Approach, 6th Edition, Pearson, 2017.
6. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

#### **Reference Books:**

1. Seymour Lipschutz, Data Structures Schaum's Outlines, Revised 1st Ed, McGraw Hill, 2014.
2. Annay Levitin, Introduction to the Design and Analysis of Algorithms, 2nd Edition, Pearson, 2009. .
3. Ramakrishnan, and Gehrke, Database management systems, 3rd Edition, McGraw Hill, 2014,

<b>TYL P3 - Java</b> <b>(Effective from the academic year 2020 -2021)</b> <b>SEMESTER – IV / VI</b>			
<b>Course Code</b>	<b>20TYLP3JV</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Contact Hours/Week</b>	<b>2 hours Practical</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Contact Hours</b>	<b>25</b>	<b>Exam Hours</b>	<b>1.5 Hours</b>
<b>CREDITS – 1</b>			
<b>Course Learning Objectives:</b> This course will enable students to:			
<ul style="list-style-type: none"> <li>➤ Understand the key concepts introduced in Java programming by writing and executing the programs.</li> <li>➤ Understand the concept of arrays and string manipulation</li> <li>➤ Understand the usage of Class, Packages, Interfaces and Exceptions.</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Control Structures:</b> Decision making statement: if, if else, if else ladder, switch; Looping statements: while, do while, for, for-each; break, continue, break in the form of goto.			<b>5</b>
<b>Module 2</b>			
<b>Arrays and Strings:</b> Arrays: One dimensional array, multidimensional array, length; String: String class, string buffer class, string builder class, string pool, string methods: length(), charAt(), substring(), contains(), join(), concat(), replace(), equals(), equalsIgnoreCase(), indexOf(), toLowerCase(), toUpperCase(), intern(), trim(), split().			<b>5</b>
<b>Module 3</b>			
<b>Class, Objects and methods:</b> Creation of classes, static and non-static members, constructor, constructor & method overloading, compile time polymorphism, final variable, final method, final class, Concept of Nested Classes, what are Nested Classes? Nested Classes Types, working of an Inner Class, what is a Local Inner Class? Anonymous Classes in java, what is a Static Nested Class? Built in classes in java: Object, Scanner, Math.			<b>5</b>
<b>Module 4</b>			
<b>Inheritance, Polymorphism, Abstract Classes, interface:</b> Introduction, Define Inheritance with an example, Accessibility concept, type of inheritance, runtime polymorphism, Method Overriding, learning how to call a Super class' Constructor, what is up casting and down casting? Familiarity with "instance of" keyword, Abstract class, use of abstract class. Interface: creation, implementation, uses, achieving multiple inheritances, comparison between interface and abstract classes, Built in interface: runnable, throwable.			<b>5</b>
<b>Module 5</b>			
<b>Package, Exception Handling, wrapper classes:</b> Package: creation, importing; Access specifier: public, private, protected, default. Built in package: lang, util, io, net. Exception Handling: Try, catch, finally, throw, throws, built in exception, user defined exception, runtime and compile time exception. Built in Exception Classes & Interfaces: Throwable, Exception, RuntimeException, and IO Exception Wrapper Classes: Wrapper classes, auto boxing, unboxing.			<b>5</b>
<b>Course Outcomes:</b> The students will be able to			

1. Demonstrate the basic programming constructs of Java.
2. Implement the concepts of arrays and strings.
3. Demonstrate the concepts of classes.
4. Apply the concepts of inheritance and polymorphism.
5. Implement the concept of Packages, Interfaces and Exceptions using Java for developing applications for given problems.

**Question Paper Pattern and Evaluation Method:**

- Test duration is one and half hour.
- Two tests (Programs) along with IAT 1 & 2 will be conducted and scale down to 40 as CIE.
- Students have to attend two medium (30 marks each) and two easy programs (20 marks each) in final assessment.
- Final test will be conducted along with 3rd IAT and the scores will be scaled down to 60 as SEE.
- Minimum passing mark: 60%

**Textbooks:**

1. Hebert Schildt and Dale Skrien, Java Fundamentals, SIE, McGraw Hill Education, 2014.
2. Herbert Schildt, JAVA the Complete Reference, 7th/9th Edition, McGraw Hill, 2007.

**Reference Books:**

1. Hari Mohan Pandey, Java Programming, 1st Edition, Pearson Education, 2012.
2. Kogent Solution Inc., Java 6 Programming Black Book, Dreamtech Press, 2007.
3. Cay Hortsman, Computing concepts with Java 2 Essentials, 2<sup>nd</sup> edition, Wiley, 1999.

**TYL P3 - Python**  
**(Effective from the Academic Year 2020 -2021)**  
**SEMESTER – V**

<b>Course Code</b>	<b>20TYLP3PY</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Contact Hours/Week</b>	<b>2 hours Practical</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Contact Hours</b>	<b>25</b>	<b>Exam Hours</b>	<b>1.5 Hours</b>

**CREDITS –1**

**Course Learning Objectives:** This course will enable the students to:

- Understand the fundamentals of Python programming concepts and essential of problem solving
- Illustrate the Object-Oriented Programming concepts to solve computational problems
- Demonstrate sorting and searching algorithms.
- Choose suitable python data structures during application development and problem solving.

<b>Modules</b>	<b>Contact Hours</b>
<b>Module 1</b>	
<b>Introduction:</b> Basics, Data types, Operators, Input / Output, Selection statements, Iteration	<b>5</b>
<b>Module 2</b>	
<b>Collections and Functions:</b> Lists, Tuples, Sets, Dictionary, Strings, Regular Expressions, Functions, List Comprehension, Lambda functions	<b>5</b>
<b>Module 3</b>	
<b>Exceptions, Files, Object Oriented Programming Concepts:</b> Exception handling, Files handling, OOPs basics: Classes and Objects, Abstract method, Static Attributes, Methods, Counter, Inheritance, Overriding, super, types	<b>5</b>
<b>Module 4</b>	
<b>Algorithm design techniques, Searching algorithms:</b> Algorithms: Introduction, Greedy approach, Dynamic Programming, Search Algorithms: Hashing, Hash tables, Linear and Binary Search Algorithms	<b>5</b>
<b>Module 5</b>	
<b>Sorting algorithms, Introduction to Database Concepts:</b> Sorting Algorithms: Selection Sort, Bubble sort, Merge and Quick Sort, DBMS-SQLite – working with DDL, DML commands	<b>5</b>

**Course Outcomes:** The students will be able to

1. Examine Python syntax and semantics and be confident in the use of Python control flow
2. structures and functions.
3. Create, run and manipulate Python Programs using core data structures like Lists,
4. Dictionaries and with the use of Regular Expressions.
5. Interpret Object-Oriented Programming concepts in Python.
6. Solve problems by applying algorithm design techniques

**Question Paper Pattern and Evaluation Method:**

- Test duration is one and half hour.
- Two tests (Programs) along with IAT 1 & 2 will be conducted and scale down to 40 as CIE.
- Students have to attend two medium (30 marks each) and two easy programs (20 marks each) in final assessment.
- Final test will be conducted along with 3rd IAT and the scores will be scaled down to 60 as

SEE.

- Minimum passing mark: 60%

**Textbooks:**

1. Al Sweigart, Automate the Boring Stuff with Python, 1<sup>st</sup> Edition, No Starch Press, 2015. (Available under CC-BY-NC-SA license <https://automatetheboringstuff.com/>)
2. Paul Barry, Head First Python, 2nd Edition, O'Reilly Media, Inc, 2016, ISBN: 9781491919538
3. Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, Data Structures and Algorithms in Python, 1st Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978- 8126562176

**Reference Books and Web References:**

1. Wesley J Chun, Core Python Applications Programming, 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365
2. <https://infytq.infosys.com/>
3. <https://www.geeksforgeeks.org/python-programming-examples/>
4. <https://www.geeksforgeeks.org/data-structures/>

**TYL P4 – Java**  
**(Effective from the academic year 2020 -2021)**  
**SEMESTER – IV / VI**

<b>Course Code</b>	<b>20TYLP4JV (Self-Paced)</b>	<b>CIE Marks</b>	<b>0</b>
<b>Number of Contact Hours/Week</b>	<b>2 hours Practical</b>	<b>SEE Marks</b>	<b>100</b>
<b>Total Number of Contact Hours</b>	<b>25</b>	<b>Exam Hours</b>	<b>1 Hour</b>

**CREDITS – 1**

**Course Learning Objectives:** This course will enable students to

- Understand threads, priorities in thread and its interaction.
- Understand collection interfaces and data structures in Java.
- Understand generics and use in programs.
- Understand the steps involved in building database connection.

**Modules**

**Contact Hours**

**Module 1**

**Java Threads:** What is a Thread? How to create and start a Thread? States of a Thread, Blocking the Execution of a Thread, Concept of Sleep Thread, Understanding the priorities in a thread, Synchronisation in Java Threads, Interaction between threads.

**6**

**Module 2**

**Collection interfaces and Data Structures in Java:** Introduction to Collection Framework, Preeminent Interfaces, What are Comparable and Comparator? Working with Lists, Maps, Sets, Queues, Stack and Map, Trees and Binary Search Trees, Comparable interface.

**6**

**Module 3**

**Java Generics:** Defining Generic List, What is Generic Map in Java? Java Generic Classes & Methods, For Loop Generic, What is Generic Wild Card?

**6**

**Module 4**

**JDBC:** The Concept of JDBC: JDBC Driver Types, JDBC Packages; A Brief Overview of the JDBC process, Database Connection, Associating the JDBC/ODBC Bridge with the Database, Statement Objects, ResultSet, Transaction Processing, Data Types.

**7**

**Course Outcomes:** The students will be able to

1. To demonstrate the usage of thread in java applications.
2. To apply a collection framework for effective coding to the given problem.
3. To apply generics list, map in interface development.
4. To build database connections for the web applications.

**Question Paper Pattern and Evaluation Method:**

- Each student will meet their respective guide every week for doubt clearing and the P4 session will be delivered in a flipped classroom manner.

**Prerequisite for attempting P4 Java test:**

- For each module a pre-test (MCQs) and post-test (MCQs) will be conducted through **HackerEarth** platform.
- Students after pre-test can refer to the contents through LMS.
- Students will have practice programs for each module which have to be solved through hacker earth platform.

**Final P4 Java Test:**

- Students have to execute 1 program (hard) and score 100% executing all 4 test cases.

**Textbooks:**

1. Hebert Schildt and Dale Skrien, Java Fundamentals, SIE, McGraw Hill Education, 2014.
2. Herbert Schildt, JAVA the Complete Reference, 7th/9th Edition, Tata McGraw Hill, 2007.
3. Kogent Solution Inc., Java 6 Programming Black Book, Dreamtech Press, 2007.

**Reference Books:**

1. Hari Mohan Pandey, Java Programming, 1st Edition, Pearson Education, 2012.
2. Cay Hortsman, Computing Concepts with Java 2 Essentials, 2<sup>nd</sup> edition, Wiley, 1999.



<b>TYL P4 – Python</b> <b>(Effective from the academic year 2020 -2021)</b> <b>SEMESTER – IV / VI</b>			
<b>Course Code</b>	<b>20TYLP4PY (Self-paced)</b>	<b>CIE Marks</b>	<b>0</b>
<b>Number of Contact Hours/Week</b>	<b>2 hours Practical</b>	<b>SEE Marks</b>	<b>100</b>
<b>Total Number of Contact Hours</b>	<b>25</b>	<b>Exam Hours</b>	<b>1 Hour</b>
<b>CREDITS – 1</b>			
<b>Course Learning Objectives:</b> This course will enable students to			
<ul style="list-style-type: none"> <li>➤ Master the fundamentals of writing python scripts</li> <li>➤ Learn core Python scripting elements such as flow control structures and user defined functions.</li> <li>➤ Use iterators, and handle dates, and Exceptions.</li> <li>➤ Understand the steps involved in creating classes and be able to incorporate object-oriented concepts like data encapsulation, operator overloading, and inheritance.</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Basics, Data types and Data structures:</b> Python Basics, Data types, Strings, Operators, Boolean Operators, Comparison operators, Collections: Lists, Tuples, Dictionaries, Sets and programs relevant in Hacker Rank			<b>5</b>
<b>Module 2</b>			
<b>Flow controls, Functions and Math:</b> Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Functions: def Statements with Parameters, Return Values and return Statements, Local and Global Scope, The global Statement, Math Functions and Sets and programs relevant in Hacker Rank			<b>6</b>
<b>Module 3</b>			
<b>Iterators, Collections, Exceptions:</b> Python Iterators, Dates, JSON, Python Regular Expression, Errors and Exceptions, handling exceptions, Programs relevant in Hacker Rank.			<b>6</b>
<b>Module 4</b>			
<b>Classes and objects:</b> Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying, Classes and functions, Time, Pure functions, Modifiers, Prototyping versus planning, Classes and methods, Object-oriented features, Printing objects, The init method, The __str__ method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation, Inheritance, Card objects, Class attributes, Inheritance, Class diagrams, Data Encapsulation, programs relevant in Hacker Rank			<b>8</b>
<b>Course Outcomes:</b> The students will be able to			
<ol style="list-style-type: none"> <li>1. Demonstrate the usage of various data structures in Python applications.</li> <li>2. Incorporate modularity for effective coding to solve the given problem.</li> <li>3. Handle exceptions efficiently in python programming</li> <li>4. Implement the OOP concepts using classes, objects and interfaces.</li> </ol>			
<b>Question Paper Pattern and Evaluation Method:</b>			
<ul style="list-style-type: none"> <li>• Each student will meet their respective guide every week for doubt clearing and the P4 session will be delivered in a flipped classroom manner.</li> </ul>			
<b>Prerequisite for attempting P4 Python test:</b>			

- For each module a pre-test (MCQs) and post-test (MCQs) will be conducted through **Hacker Earth** platform.
- Students after pre-test can refer to the contents through LMS.
- Students will have practice programs for each module which have to be solved through hacker earth platform.

**Final P4 Python Test:**

- Students have to execute 1 or 2 hard programs and score 100% executing all the test cases.

**Textbooks:**

1. Al Sweigart, Automate the Boring Stuff with Python, 1<sup>st</sup> Edition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at <https://automatetheboringstuff.com/>)
2. Paul Barry, Head First Python, O' Reilly Media, 2016, ISBN: 9781491919538, 1491919531

**Reference Books and Web References:**

1. Gowrishankar S, Veena A, Introduction to Python Programming, 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372
2. Jake VanderPlas, Python Data Science Handbook: Essential Tools for Working with Data, 1st Edition, O'Reilly Media, 2016. ISBN-13: 978-14919120583.
3. Al Sweigart, Beyond the Basic Stuff with Python: 3. Best Practices for Writing Clean Code, No Starch Press. 2020
4. Wesley J Chun, Core Python Applications Programming, 3rd Edition, Pearson Education, India, 2015. ISBN-13: 978-9332555365
5. <https://infytq.infosys.com/>
6. <https://www.geeksforgeeks.org/python-programming-examples/>
7. <https://www.geeksforgeeks.org/data-structures/>
8. <https://automatetheboringstuff.com/>

<b>TYL P5 - Big Data Analytics</b> <b>(Effective from the academic year 2020-2021)</b> <b>SEMESTER-VI</b>			
<b>Course Code</b>	<b>20TYLP5BD (Self-paced)</b>	<b>CIE Marks</b>	<b>0</b>
<b>Number of Contact Hours/Week</b>	<b>4 hours Practical</b>	<b>SEE Marks</b>	<b>100</b>
<b>Total Number of Contact Hours</b>	<b>32</b>	<b>Exam Hours</b>	<b>30 min.</b>
<b>CREDITS -2</b>			
<b>Course Learning Objectives:</b> This course will enable students to			
<ul style="list-style-type: none"> <li>➤ Understand fundamentals of Big Data analytics</li> <li>➤ Explore the Hadoop framework and Hadoop Distributed File system</li> <li>➤ Develop NoSQL applications using MongoDB and Cassandra for Big Data</li> <li>➤ Employ MapReduce programming model to process big data</li> <li>➤ Solve complex real-world problems for decision support</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Introduction to Big Data:</b> Data analytics lifecycle, Big Data overview, data science, roles of a data scientist, Big Data Analytics in industry, Data Discovery, Data Preparation, Data Model Planning, Data Model Building, Data Insights			<b>7</b>
<b>Module 2</b>			
<b>Introduction to Hadoop:</b> Introduction, Hadoop and its Ecosystem, Hadoop Distributed File System, MapReduce Framework and Programming Model, Hadoop Yarn, Hadoop Ecosystem Tools. <b>Hadoop Distributed File System Basics:</b> HDFS Design Features, Components, HDFS User Commands.			<b>6</b>
<b>Module 3</b>			
<b>MapReduce, Hive and Pig:</b> Introduction, MapReduce Map Tasks, Reduce Tasks and MapReduce Execution, Composing MapReduce for Calculations and Algorithms, Hive, HiveQL, Pig.			<b>6</b>
<b>Module 4</b>			
<b>Machine Learning Algorithms for Big Data Analytics:</b> Introduction, Estimating the relationships, Outliers, Variances, Probability Distributions, and Correlations, Regression analysis, Finding Similar Items, Similarity of Sets and Collaborative Filtering, Frequent Itemsets and Association Rule Mining			<b>7</b>
<b>Module 5</b>			
<b>Case Studies:</b> <ul style="list-style-type: none"> <li>• <a href="https://bigdata-madesimple.com/17-important-case-studies-on-big-data/">https://bigdata-madesimple.com/17-important-case-studies-on-big-data/</a></li> <li>• <a href="https://www.nap.edu/read/23654/chapter/5#36">https://www.nap.edu/read/23654/chapter/5#36</a></li> <li>• <a href="https://businessgrow.com/2016/12/06/big-data-case-studies/">https://businessgrow.com/2016/12/06/big-data-case-studies/</a></li> <li>• <a href="https://www.arcadiadata.com/customers/case-studies/">https://www.arcadiadata.com/customers/case-studies/</a></li> <li>• <a href="https://www.ibmbigdatahub.com/tag/273/blog">https://www.ibmbigdatahub.com/tag/273/blog</a></li> </ul>			<b>6</b>
<b>Course Outcomes:</b> The student will be able to:			
<ul style="list-style-type: none"> <li>➤ Understand fundamentals of Big Data analytics.</li> <li>➤ Investigate Hadoop framework and Hadoop Distributed File system.</li> <li>➤ Develop databases using MongoDB and Cassandra for Big Data.</li> <li>➤ Demonstrate the MapReduce programming model to process big data using Hadoop and</li> </ul>			

related tool.

- Use Machine Learning algorithms for real world big data.

### **Pedagogy, Question Paper Pattern and Evaluation Method:**

- An MCQ type test comprises of 25 questions, each carry one mark.
- The student needs to develop an application using big data environment such as Hadoop / Spark as a mini project of his or her choice. The results must be represented using appropriate metrics and charts for visualization.
- The mini project will be evaluated for 75 marks.
- Students should submit 5to10 pages report which carries 10 marks out of 75 marks

### **Textbooks:**

1. Raj Kamal and Preeti Saxena, Big Data Analytics Introduction to Hadoop, Spark, and Machine-Learning, McGraw Hill Education, 2018
2. Douglas Eadline, Hadoop 2 Quick-Start Guide: Learn the Essentials of Big Data Computing in the Apache Hadoop 2 Ecosystem, 1<sup>st</sup> Edition, Pearson Education, 2016

### **Reference Books:**

1. Tom White, Hadoop: The Definitive Guide, 4 Edition, O'Reilly Media,
2. Boris Lublinsky, Kevin T. Smith, Alexey Yakubovich, Professional Hadoop Solutions, 1<sup>st</sup> Edition, Wrox Press, 2014 ISBN-13: 978-8126551071
3. Eric Sammer, Hadoop Operations: A Guide for Developers and Administrators,1<sup>st</sup> Edition, O'Reilly Media, 2012. ISBN-13: 978-9350239261

**TYL P5 - Cloud Computing**  
**(Effective from the academic year 2020 -2021)**  
**SEMESTER – VI**

<b>Course Code</b>	<b>20TYLP5CC (Self-Paced)</b>	<b>CIE Marks</b>	<b>0</b>
<b>Number of Contact Hours/Week</b>	<b>2 hours Practical</b>	<b>SEE Marks</b>	<b>100</b>
<b>Total Number of Contact Hours</b>	<b>20</b>	<b>Exam Duration</b>	<b>30 Min</b>

**CREDITS – 1**

**Course Learning Objectives:** This course will enable the students to:

- Learn about the emerging technology in this tech-era
- Understand the technical background about cloud computing
- Learn the different architecture models related to the computing services
- Apply the publicly available cloud model for developing applications

<b>Modules</b>	<b>Contact Hours</b>
<b>Module1</b>	
<b>INTRODUCTION:</b> Eras of Computing, The Vision of Cloud Computing, Defining a cloud, Cloud computing Reference Model: Architecture, IaaS, PaaS, SaaS, Types of Clouds: Public, Private, Hybrid and Community Clouds.	<b>4</b>
<b>Module 2</b>	
<b>DISTRIBUTED SYSTEM:</b> Introduction, Goals of Distributed System, Examples of distributed systems, Trends in distributed systems, Resource sharing in distributed system, Challenges faced, System Models basics, types of System Models, Physical models, Architectural models, Fundamental models.	<b>4</b>
<b>Module 3</b>	
<b>VIRTUALISATION</b> Introduction, Characteristics of virtualized environment, Taxonomy of visualization techniques, Virtualisation and Cloud Computing, Technology examples: Xen, VMWare, Microsoft Hyper-V	<b>4</b>
<b>Module 4</b>	
<b>INDUSTRIAL PLATFORMS:</b> Amazon Web Services, Google App Engine, Microsoft Azure	<b>4</b>
<b>Module 5</b>	
<b>CLOUD SECURITY:</b> Infrastructure security, data security and storage, identity and access management, security management in the cloud.	<b>4</b>

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

1. Understand the fundamentals of cloud computing technology.
2. Understand the supporting environment such as distributed computing and virtualisation.
3. Realise the industrial platforms as premier cloud environments.
4. Understand the importance of different aspects of security in cloud computing technology.

**Pedagogy, Question Paper Pattern and Evaluation Method:**

- Each student will meet their respective guide every week for doubt clearing and the P5 session will be delivered as a Video class and Flipped class.
- The SEE component consists of 1 MCQ test + Mini Project Evaluation.
- MCQ test paper comprises 25 questions each carrying one mark.
- The student needs to develop a mini project of his or her choice in any publicly available cloud platform and demonstrate. The mini project will be evaluated for 75 marks.
- Students should submit a 5 to 10 page report which carries 10 marks out of 75.

**Text Book**

1. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Mastering Cloud Computing: Foundations and applications programming, Morgan Kaufmann, 2013.

**Reference Books and Web References:**

1. George Colouris, Jean Dollimore, Tim Kinberg, Gordon Blair, Distributed Systems: Concepts Design, Fifth Edition, Addison Wesley
2. Tim Mather, Subra Kumaraswamy, Shahed Latif, Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance”, O'Reilly Media, 1st edition, 2009.
3. [https://aws.amazon.com/training/?nc2=sb\\_tc](https://aws.amazon.com/training/?nc2=sb_tc)
4. <https://cloud.google.com/training>
5. <https://docs.microsoft.com/en-us/learn/azure/>

<b>TYL P5 - Full Stack Development</b> <b>(Effective from the academic year 2020 -2021)</b> <b>SEMESTER – VI</b>			
<b>Course Code</b>	<b>20TYLP5FS (Self-paced)</b>	<b>CIE Marks</b>	<b>0</b>
<b>Number of Contact Hours/Week</b>	<b>4 hours Practical</b>	<b>SEE Marks</b>	<b>100</b>
<b>Total Number of Contact Hours</b>	<b>32</b>	<b>Exam Duration</b>	<b>30 Min</b>
<b>CREDITS – 2</b>			
<b>Course Learning Objectives:</b> This course will enable the students to <ul style="list-style-type: none"> <li>➤ Illustrate the Semantic Structure of HTML and CSS</li> <li>➤ Design Dynamic Client-Side programs using JavaScript.</li> <li>➤ Design Dynamic Server-Side programs using PHP, MySQL and JavaScript.</li> <li>➤ Learn NodeJS and examine JavaScript frameworks like Express.</li> <li>➤ Examine ReactJS fundamentals to match the current Web App development Trend.</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1:</b>			
<b>Client-Side Development: Static Front-End Design</b> <b>INTRODUCTION:</b> Introduction to HTML, Quick Tour of HTML Elements, HTML5 Semantic Structure Elements, Introduction to CSS The Cascade: How Styles Interact, The Box Model, CSS Text Styling, Styling Tables.			<b>6</b>
<b>Module 2:</b>			
<b>Client-Side Development: Dynamic Front End Design:</b> Introducing Forms, Form Control Elements, Table and Form Accessibility JavaScript: Client-Side Scripting, What is JavaScript and What can it do?, JavaScript Design Principles, Where does JavaScript Go?, Syntax, JavaScript Objects, The Document Object Model (DOM), JavaScript Events.			<b>6</b>
<b>Module 3:</b>			
<b>Server-Side PHP Web App Development:</b> Network fundamentals, A Web Server's Responsibilities, setting up XAMP Web Server, PHP fundamentals, MySQL fundamentals, building a PHP Web App, hosting fundamentals. Introduction to existing Frameworks			<b>7</b>
<b>Module 4:</b>			
<b>Web Development with Node &amp; Express:</b> Getting Started with Node, Introducing Express, Saving Time with Express, Tidying Up, Quality Assurance, The Request and Response Objects, Templating with Handlebars Form Handling, Cookies and Sessions.			<b>6</b>
<b>Module 5:</b>			
<b>Full Stack web App Development using React JS:</b> Installing React, your first React Web Application, components, Components and Servers, JSX and the Virtual DOM, Routing, Intro to Flux and Redux.			<b>7</b>
<b>Course Outcomes: At the end of the course, the student will be able to:</b> <ol style="list-style-type: none"> <li>1. Adapt HTML and CSS syntax and semantics to build web pages.</li> <li>2. Develop Client-Side Scripts using JavaScript</li> <li>3. Develop Server-Side Scripts using PHP and MySQL to generate and display the contents dynamically.</li> <li>4. Inspect JavaScript platforms like NodeJS, Express, and ReactJS to focus on Core features.</li> </ol>			
<b>Pedagogy, Question Paper Pattern and Evaluation Method:</b>			

- Each student will meet their respective guide every week for doubt clearing and the P5 session will be delivered as a Video class and Flipped class.
- The SEE component consists of 1 MCQ test + Mini Project Evaluation.
- MCQ test paper comprises 25 questions each carrying one mark .
- The student needs to develop a Web Application solving a societal problem as a mini project of and demonstrate the same. The mini project will be evaluated for 75 marks.
- Students should submit a 5 to10 page report which carries 10 marks out of 75.

#### **Text Books:**

1. Randy Connolly, Ricardo Hoar, Fundamentals of Web Development, 1<sup>st</sup> Edition, Pearson Education India. 2016 (ISBN:978-9332575271)
2. Web Development with Node and Express, Ethan Brown, O'Reilly publications, 1<sup>st</sup> Edition, ISBN: 978-1-491-94930-6, 2014.
3. Fullstack React, The complete Guide to ReactJS and Friends, Anthony Accomazzo, Ari Lerner et.al, 2017

#### **Reference Books and Web References:**

1. Robin Nixon, Learning PHP, MySQL & Java Script with jQuery, CSS and HTML5, 4<sup>th</sup> Edition, O'Reilly Publications, 2015. (ISBN:978-9352130153)
2. Luke Welling, Laura Thomson, PHP and MySQL Web Development, 5<sup>th</sup> Edition, Pearson Education, 2016. (ISBN:978-9332582736)
3. Nicholas C Zakas, Professional JavaScript for Web Developers, 3<sup>rd</sup> Edition, Wrox/Wiley India, 2012. (ISBN:978-8126535088)
4. David Sawyer Mcfarland, JavaScript & jQuery: The Missing Manual, 1<sup>st</sup> Edition, O'Reilly/Shroff Publishers & Distributors Pvt Ltd, 2014
5. [https://www.w3schools.com/whatis/whatis\\_fullstack.asp](https://www.w3schools.com/whatis/whatis_fullstack.asp)



<b>TYL P5 - Machine Learning using Python</b> <b>(Effective from the academic year 2020-2021)</b> <b>SEMESTER-VI</b>			
<b>Course Code</b>	<b>20TYLP5ML (Self-paced)</b>	<b>CIE Marks</b>	<b>0</b>
<b>Number of Contact Hours/Week</b>	<b>4 hours Practical</b>	<b>SEE Marks</b>	<b>100</b>
<b>Total Number of Contact Hours</b>	<b>32</b>	<b>Exam Hours</b>	<b>30 min.</b>
<b>CREDITS -2</b>			
<b>Course Learning Objectives:</b> The objective of the course is to enable the students to:			
<ul style="list-style-type: none"> <li>➤ Understand the basic theory underlying machine learning.</li> <li>➤ Formulate machine learning problems corresponding to different applications.</li> <li>➤ Understand a range of machine learning algorithms along with their strengths and weaknesses.</li> <li>➤ Apply machine learning algorithms to solve problems of moderate complexity. To apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Python Basics for Machine Learning:</b> Python Programming Fundamentals - Conditions and Branching, Loops, Functions, Python Data Structures- Lists, Tuples, Sets, Dictionaries, Working with Data in Python-Reading, writing files and Loading data with Pandas, Working with NumPy Arrays- 1d Arrays, 2d Arrays			<b>7</b>
<b>Module 2</b>			
<b>Introduction to Machine Learning :</b> Supervised vs Unsupervised, Simple Linear Regression, Multiple Linear Regression, Non-Linear Regression, Classification - Introduction to Classification, K-Nearest Neighbours, Evaluation Metrics in Classification, Introduction to Decision Trees, Building Decision Trees, Intro to Logistic Regression, Logistic regression vs Linear regression, Logistic Regression Training, Support Vector Machine, Python libraries suitable for Machine Learning.			<b>7</b>
<b>Module 3</b>			
<b>Clustering:</b> Introduction , k-Means clustering, Hierarchical Clustering, Train/Test Split, Dimensionality Reduction, Root Mean Squared Error, Random Forests, Building models using python			<b>6</b>
<b>Module 4</b>			
<b>Data visualization:</b> Usage of Matplotlib, Seaborn- Finding Distribution of data with histograms, creating subplots, histograms, Creating Time Series with Line-Charts, creating bar graphs and scatter plots, understanding trends, patterns, correlations.			<b>6</b>
<b>Module 5</b>			
Case studies from Kaggle: 1. 2021 Olympics in Tokyo: <a href="https://www.kaggle.com/arjunprasadsarkhel/2021-olympics-in-tokyo">https://www.kaggle.com/arjunprasadsarkhel/2021-olympics-in-tokyo</a> 2. Digit recognizer using MNIST dataset: <a href="https://www.kaggle.com/ngbolin/mnist-dataset-digit-recognizer">https://www.kaggle.com/ngbolin/mnist-dataset-digit-recognizer</a> 3. Heart Failure Prediction: <a href="https://www.kaggle.com/fedesoriano/heart-failure-prediction">https://www.kaggle.com/fedesoriano/heart-failure-prediction</a> 4. Movie Recommendation system using IMDB dataset: <a href="https://www.kaggle.com/harshitshankhdhar/imdb-dataset-of-top-1000-movies-">https://www.kaggle.com/harshitshankhdhar/imdb-dataset-of-top-1000-movies-</a>			<b>6</b>

and-tv-shows	
<b>Course Outcomes:</b> The student will be able to:	
<ol style="list-style-type: none"> <li>1. Apply suitable classification and clustering technique for solving problems</li> <li>2. Develop solutions to unstructured problems using machine learning techniques</li> <li>3. Analyse the given dataset using visualization tools and packages</li> </ol>	
<b>Pedagogy, Question Paper Pattern and Evaluation Method:</b>	
<ul style="list-style-type: none"> <li>• The SEE component consists of 1 MCQ test + Mini Project Evaluation.</li> <li>• MCQ test paper comprises 25 questions each carrying one mark.</li> <li>• The student needs to develop an ML application as a mini project of his or her choice. The solution must include machine learning techniques such as Classification, Clustering or deep learning algorithms. The standard data sets available in internet sites like Kaggle may be used for analysis</li> <li>• The mini-project will be evaluated for 75 marks.</li> <li>• Students should submit 5 to 10 pages report which carries 10 marks out of 75 marks.</li> </ul>	
<b>Textbooks:</b>	
<ol style="list-style-type: none"> <li>1. Machine Learning, Tom Mitchell, McGraw Hill, 1997, ISBN 0-07-042807-7.</li> <li>2. Marco Gori , Machine Learning: A Constraint-Based Approach, Morgan Kaufmann. 2017.</li> <li>3. Pattern Recognition and Machine Learning, Christopher Bishop, Springer 2006.</li> </ol>	
<b>Reference Books:</b>	
<ol style="list-style-type: none"> <li>1. Introduction to Statistical Learning, Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Springer, 2013.</li> <li>2. Pattern Classification, 2nd Ed., Richard Duda, Peter Hart, David Stork, John Wiley &amp; Sons, 2001.</li> </ol>	

<b>TYL A1 – Aptitude Basics</b> <b>(Effective from the academic year 2018 -2019)</b> <b>SEMESTER – I/II</b>			
<b>Course Code</b>	<b>18TYLA1</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Contact Hours/Week</b>	<b>2</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Contact Hours</b>	<b>24</b>	<b>Exam Hours</b>	<b>1 Hour</b>
<b>CREDITS –2</b>			
<b>Course Learning Objectives:</b>			
<ul style="list-style-type: none"> <li>➤ To create awareness among students the importance of Aptitude in the present-day Competitive Exams</li> <li>➤ To train the students develop the required skills to think in new and innovative way</li> <li>➤ To provide strong foundation for advanced aptitude training</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Basic Math skills:</b> Modern Math, Vedic Math Methods, Divisibility Rules			<b>6</b>
<b>Module 2</b>			
<b>Basic Calculation Skills:</b> Percentages, Ratio and Proportions, Profit and Loss, Averages, Ages, Allegations and Mixtures			<b>6</b>
<b>Module 3</b>			
<b>Series based math:</b> Number Series, Letter Series, Odd man out series			<b>6</b>
<b>Module 4</b>			
<b>Puzzle Based math:</b> Clocks, Calendars, Coding & Decoding, Direction Based, Blood Relations			<b>6</b>
<b>Course Outcomes: The student will be able to:</b>			
Think innovatively Develop a problem-solving mind-set			
<b>Question Paper Pattern &amp; Evaluation Method:</b>			
<b>Quiz Assessments:</b> (Maximum Marks: 10 marks   Minimum Marks: 5 marks) <ul style="list-style-type: none"> <li>• 4 Quizzes containing 30 Questions each will be given after completion of every module. Each quiz will have 30 credits</li> <li>• Average Quiz Assessment Marks: 4 Quiz's average credit is taken for evaluation. This average is reduced to 10 Marks i.e., 12 credits = 1 marks.</li> <li>• *To get eligibility students have to score minimum marks of 5 out of 10</li> </ul>			
<b>Internal Assessment Tests:</b> (Maximum Marks: 30 marks   Minimum Marks: 15 marks) <ul style="list-style-type: none"> <li>• Total 2 IAT's are conducted. Average of both IAT is taken i.e., Maximum 30 marks will be allocated.</li> </ul>			
<b>Final TYL Exam</b> (Maximum Marks: 60 marks   Minimum Marks: 30 marks) <ul style="list-style-type: none"> <li>• Final Exam is conducted by combining all Aptitude subjects</li> <li>• Quantitative Aptitude: 20 Questions   Logical Reasoning: 20 Questions   Verbal Ability: 20 Questions   Total marks allotted: 60 marks</li> </ul>			
Total Exam Marks for A2: Quiz + IAT + Exam = 10+30+60 = 100 Marks Minimum marks for passing - 60 Marks			
<b>Textbooks:</b>			
1. R.S. Agarwal, Quantitative Aptitude, 2021, S Chand Publications 2. TYL Aptitude Workbook Version V21, 2021, CMRIT Publications			

<b>Reference Books and Web References:</b>
<ol style="list-style-type: none"><li>1. George Summers, The Great Book of Mind Teasers and Puzzles, 2009, Sterling Juvenile</li><li>2. Sharon Weiner Green M.A. &amp; Ira K. Wolf Ph.D. , Baron's GRE, 22<sup>nd</sup> Edition , Barons Educational Series</li><li>3. Shakuntala Devi, Puzzles to Puzzle You, 1979, Orient Paperbacks</li></ol>

<b>TYL A2 – Aptitude-2</b> <b>(Effective from the academic year 2018 -2019)</b> <b>SEMESTER – V</b>			
<b>Course Code</b>	<b>18TYLA2</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Contact Hours/Week</b>	<b>3</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Contact Hours</b>	<b>36</b>	<b>Exam Hours</b>	<b>1 Hour</b>
<b>CREDITS –3</b>			
<b>Course Learning Objectives:</b>			
<ul style="list-style-type: none"> <li>➤ To make the students aware of the importance of Aptitude in the present-day Competitive Exams</li> <li>➤ To train the students develop the required skills to think in new and innovative way</li> <li>➤ To encourage students for employment and to develop the bright future</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Number System 1:</b> Remainder Theorems Advanced, Finding Factors, Unit Digit, HCF LCM			<b>6</b>
<b>Module 2</b>			
<b>Time Based Math:</b> Time and work, Pipes and cistern, Time speed distance, Trains, boats streams, Escalators, Races			<b>6</b>
<b>Module 3</b>			
<b>Seating Arrangements:</b> Single row, Multiple rows, Circular, Polygon			<b>6</b>
<b>Module 4</b>			
<b>Deductive Reasoning:</b> Syllogisms, Venn Diagram, Reasoning Inequality, Puzzles			<b>6</b>
<b>Module 5</b>			
<b>Grammar Revision:</b> Parts of Speech, Tenses, Auxiliary verbs, Subject verb Agreement, Phrasal verbs, Error Spotting			<b>4</b>
<b>Module 6</b>			
<b>Verbal Reasoning:</b> Statements and Conclusions, Statements and Assumptions, Cause and Effect, Course of Action, <b>Essay Writing Skills</b>			<b>8</b>
<b>Course Outcomes: The student will be able to:</b>			
<ol style="list-style-type: none"> <li>1. Develop higher order thinking capability</li> <li>2. Develop problem solving mindset</li> <li>3. Enhance verbal ability and language proficiency</li> </ol>			
<b>Question Paper Pattern &amp; Evaluation Method:</b>			
<b>Quiz Assessments:</b> (Maximum Marks: 10 marks   Minimum Marks: 5 marks) <ul style="list-style-type: none"> <li>● 6 Quizzes containing 30 Questions each will be given after completion of every module. Each quiz will have 30 credits</li> <li>● Average Quiz Assessment Marks: 6 Quiz's average credit is taken for evaluation. This average is reduced to 10 Marks</li> <li>● *To get eligibility students have to score minimum marks of 5 out of 10</li> </ul>			
<b>Internal Assessment Tests:</b> (Maximum Marks: 30 marks   Minimum Marks: 15 marks) <ul style="list-style-type: none"> <li>● Total 2 IAT's are conducted. Average of both IAT is taken i.e., Maximum 30 marks will be allocated.</li> </ul>			
<b>Final TYL Exam</b> (Maximum Marks: 60 marks   Minimum Marks: 30 marks)			

- Final Exam is conducted by combining all Aptitude subjects
- Quantitative Aptitude: 20 Questions | Logical Reasoning: 20 Questions | Verbal Ability: 20 Questions | Total marks allotted: 60 marks

Total Exam Marks for A2: Quiz + IAT + Exam = 10+30+60 = 100 Marks

Minimum marks for passing - 60 Marks

**Textbooks:**

1. R.S. Aggarwal, Quantitative Aptitude, Revised Edition, S Chand Publications
2. TYL Aptitude Workbook Version V21, 2021, CMRIT Publications

**Reference Books and Web References:**

**Reference Materials for Quantitative:**

1. George Summers, The Great Book of Mind Teasers and Puzzles, 2009, Sterling Juvenile
2. Sharon Weiner Green M.A. & Ira K. Wolf Ph.D. , Baron's GRE, 22<sup>nd</sup> Edition , Barons Educational Series
3. Shakuntala Devi, Puzzles to Puzzle You, 1979, Orient Paperbacks

**Reference Materials for Reasoning:**

1. R S Aggarwal, A Modern Approach To Verbal & Non-Verbal Reasoning, 2022, S. Chand Publications
2. M K Pandey, Analytical Reasoning, 2009, Bsc Publishing Co. Pvt. Ltd; 3rd edition

**Reference Materials Verbal:**

1. Raymond Murphy, English Grammar in Use Book with Answers: A Self-Study Reference and Practice Book for Intermediate Learners of English, 4th edition, 2021, Cambridge University Press
2. R. S. Aggarwal and Vikas Aggarwal, Quick Learning Objective General English, 2017, S Chand Publishing
3. Wren and Martin, High School English Grammar & Composition, 2019, S Chand Publishing

<b>TYL A3 – Aptitude-3</b> <b>(Effective from the academic year 2018 -2019)</b> <b>SEMESTER – VI</b>			
<b>Course Code</b>	<b>18TYLA3</b>	<b>CIE Marks</b>	<b>40</b>
<b>Number of Contact Hours/Week</b>	<b>3</b>	<b>SEE Marks</b>	<b>60</b>
<b>Total Number of Contact Hours</b>	<b>36</b>	<b>Exam Hours</b>	<b>1 Hour</b>
<b>CREDITS –3</b>			
<b>Course Learning Objectives:</b>			
<ul style="list-style-type: none"> <li>➤ To make the students aware of the importance of Aptitude in the present-day Competitive Exams</li> <li>➤ To train the students develop the required skills to think in new and innovative way</li> <li>➤ To encourage students for employment and to develop the bright future</li> <li>➤ To crack most difficult placement Exams, Gate and other Govt Job Exams</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Number System 2:</b> Remainder Theorems Advanced, last 2 digits, Progression <b>Geometry:</b> Mensuration, 2 Questions, 3D Questions			<b>6</b>
<b>Module 2</b>			
<b>Engineering Math:</b> Simple Interest and Compound Interest, Logarithm, Permutation and Combination, Probability <b>Puzzles and Riddles</b>			<b>6</b>
<b>Module 3</b>			
<b>Data Sufficiency:</b> Yes/No Questions, Value Questions <b>Seating Arrangements:</b> Mixed Questions, Company Specific			<b>6</b>
<b>Module 4</b>			
<b>Data Interpretation:</b> Tabular Column, Bar chart, Pie chart, Line graph, Reasoning data interpretation			<b>6</b>
<b>Module 5</b>			
<b>Vocabulary:</b> Antonyms, Synonym, One word substitution, Analogies, Ology, Idioms and Phrases <b>Miscellaneous:</b> Last Line Questions, Strong and Weak Argument, Fact Inference Judgments			<b>6</b>
<b>Module 6</b>			
<b>Reading Comprehension:</b> Types of Passages, Types of Questions, Tips and Tricks to solve Jumbled paragraph			<b>6</b>
<b>Course Outcomes: The student will be able to:</b>			
<ol style="list-style-type: none"> <li>1. Develop higher order thinking capability</li> <li>2. Develop problem solving mindset</li> <li>3. Enhance verbal ability and language proficiency</li> <li>4. Perform well in competitive exams</li> </ol>			
<b>Question Paper Pattern &amp; Evaluation Method:</b>			
<b>Quiz Assessments:</b> (Maximum Marks: 10 marks   Minimum Marks: 5 marks) <ul style="list-style-type: none"> <li>● 6 Quizzes containing 30 Questions each will be given after completion of every module. Each quiz will have 30 credits</li> <li>● Average Quiz Assessment Marks: 6 Quiz's average credit is taken for evaluation. This average is reduced to 10 Marks</li> </ul>			

- \*To get eligibility students have to score minimum marks of 5 out of 10

**Internal Assessment Tests:** (Maximum Marks: 30 marks | Minimum Marks: 15 marks)

- Total 2 IAT's are conducted. Average of both IAT is taken i.e., Maximum 30 marks will be allocated.

**Final TYL Exam** (Maximum Marks: 60 marks | Minimum Marks: 30 marks)

- Final Exam is conducted by combining all Aptitude subjects
- Quantitative Aptitude: 20 Questions | Logical Reasoning: 20 Questions | Verbal Ability: 20 Questions | Total marks allotted: 60 marks

Total Exam Marks for A2: Quiz + IAT + Exam = 10+30+60 = 100 Marks

Minimum marks for passing - 60 Marks

**Textbooks:**

1. R.S. Aggrawal, Quantitative Aptitude, Revised Edition, S Chand Publications
2. TYL Aptitude Workbook Version V21, 2021, CMRIT Publications

**Reference Books and Web References:**

**Reference Materials for Quantitative:**

1. Sharon Weiner Green M.A. & Ira K. Wolf Ph.D. , Baron's GRE, 22nd Edition , Barons Educational Series
2. Abhijit Guha, Quantitative Aptitude, 7<sup>th</sup> Edition 2020, McGraw Hill

**Reference Materials for Reasoning:**

1. A.K Gupta, Logical and Analytical Reasoning (English), 2020 1st Edition, Ramesh Publishing House
2. Jaikishan and Premkishan, How to Crack Test of Reasoning: In All Competitive Exams, Revised Edition, 2021, Arihant Publishers

**Reference Materials Verbal:**

1. Sharon Weiner Green M.A. & Ira K. Wolf Ph.D. , Baron's GRE, 22nd Edition , Barons Educational Series
2. Arun Sharma and Meenakshi Upadyay, How to Prepare for Verbal Ability and Reading Comprehension' , 2018, McGraw Hill Education



<b>TYL S1 – Soft Skills-1</b> <b>(Effective from the academic year 2018 -2019)</b> <b>SEMESTER – I/II</b>			
<b>Course Code</b>	<b>18TYLS1</b>	<b>CIE Marks</b>	<b>0</b>
<b>Number of Contact Hours/Week</b>	<b>1</b>	<b>SEE Marks</b>	<b>100</b>
<b>Total Number of Contact Hours</b>	<b>12</b>	<b>Exam Hours</b>	<b>N A</b>
<b>CREDITS –1</b>			
<b>Course Learning Objectives:</b>			
<ul style="list-style-type: none"> <li>➤ To make the students aware of the importance of soft-skills in the present-day business world and work environment.</li> <li>➤ To train the students develop the required skills to effectively interact with people and to articulate their ideas.</li> <li>➤ To encourage students to be part of a team and achieve synergy.</li> <li>➤ To Instil confidence and professionalism in students</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Confidence Building:</b> Fight stage fear, JAM Sessions, improving communication and using power of imagination, Extempore			<b>4</b>
<b>Module 2</b>			
<b>Presentation skills – without using visual aids:</b> Tips for preparing for a presentation Do's and Don'ts, Making groups and asking to present on a topic			<b>3</b>
<b>Module 3</b>			
<b>Business Etiquettes:</b> Telephone, Meeting, Office, Dining and Email Etiquettes, Role plays			<b>3</b>
<b>Module 4</b>			
<b>Cover letter &amp; Resume Building:</b> Frameworks, Rules and Regulations, Assignments to build a resume			<b>2</b>
<b>Course Outcomes: The student will be able to :</b>			
<ol style="list-style-type: none"> <li>1. Communicate effectively with people in simple and good English.</li> <li>2. Learn how to give a presentation on a given topic.</li> <li>3. Manage stage fear without stage fright.</li> <li>4. Prepare their resumes and covering letters in a professional manner.</li> <li>5. Communicate effectively through email and phone.</li> <li>6. Articulate viewpoint with clarity.</li> </ol>			
<b>Question Paper Pattern &amp; Evaluation Method:</b>			
Students are assessed as per the following parameters <ul style="list-style-type: none"> <li>● Presentation                      20 marks</li> <li>● Fluency                              20 marks</li> <li>● Vocabulary                        20 marks</li> <li>● Language Quality                20 marks</li> <li>● Pronunciation                    20 marks</li> </ul>			
Maximum Marks - 100 Marks, Minimum marks for passing - 50 Marks			

<b>Textbooks:</b>
<ol style="list-style-type: none"> <li>1. Subhratho Bagchi , The Professional , Portfolio Publishing, 2011, USA</li> <li>2. Mouna Muthamma C. P, TYL Soft skills Workbook V1, 2021, CMRIT Publications</li> </ol>
<b>Reference Books and Web References:</b>
<ol style="list-style-type: none"> <li>1. Michelle N Halsey Pmp, Top 10 Soft Skills You Need: 90-Minute Guide, 2017, Silver City Publications &amp; Training, L.L.C.</li> <li>2. David J. Schwartz, The Magic of Thinking Big, 1987, Simon &amp; Schuster</li> </ol>

<b>TYL S2 – Soft Skills-2</b> <b>(Effective from the academic year 2018 -2019)</b> <b>SEMESTER – V</b>			
<b>Course Code</b>	<b>18TYLS2</b>	<b>CIE Marks</b>	<b>0</b>
<b>Number of Contact Hours/Week</b>	<b>1</b>	<b>SEE Marks</b>	<b>100</b>
<b>Total Number of Contact Hours</b>	<b>12</b>	<b>Exam Hours</b>	<b>NA</b>
<b>CREDITS –1</b>			
<b>Course Learning Objectives:</b>			
<ul style="list-style-type: none"> <li>➤ To make the students aware of the importance of soft-skills in the present-day business world and work environment.</li> <li>➤ To train the students develop the required skills to effectively interact with people and to articulate their ideas.</li> <li>➤ To encourage students to be part of a team and achieve synergy.</li> <li>➤ To develop students' overall personality.</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Intrapersonal skills &amp; Interpersonal skills:</b> Emotional Management, Building self-confidence and self-esteem, Situational leadership			<b>3</b>
<b>Module 2</b>			
<b>Goal Settings &amp; Time Management:</b> <b>Goal Setting:</b> Long term and short-term goal setting, Action plan for achieving goals Professional goal setting <b>Time management:</b> Tools & techniques for time management			<b>3</b>
<b>Module 3</b>			
<b>Personal Grooming &amp; Body Language:</b> Grooming & Power Dressing, Body Language			<b>2</b>
<b>Module 4</b>			
<b>Team building &amp; Conflict Resolution:</b> Stages in team formation, Difference between team and group, Elements of teamwork Conflict resolution Strategies			<b>4</b>
<b>Course Outcomes: The student will be able to :</b>			
1. Communicate effectively with people in simple and good English. 2. Work in teams with common objectives as well as focus on individual performance. 3. Make self-analysis, identifying the areas of strength and weaknesses, set the professional goals accordingly. 4. Manage conflicts in a personal and professional environment.			
<b>Question Paper Pattern &amp; Evaluation Method:</b>			
Students are evaluated based on following parameters <ul style="list-style-type: none"> <li>● Communication                      20 marks</li> <li>● Active Participation                20 marks</li> <li>● Team Work                            20 marks</li> <li>● Conflict Resolution                 20 marks</li> <li>● Emotional Quotient                20 marks</li> </ul> Maximum Marks - 100 Marks, Minimum marks for passing - 50 Marks			

<b>Textbooks:</b>	
<ol style="list-style-type: none"> <li>1. Mouna Muthamma C. P, TYL Soft skills Workbook V1, 2021, CMRIT Publications</li> <li>2. 'Seven Habits of Highly Effective People' by Stephen Covey, Pocket Books, 2004, New York</li> <li>3. Subhratho Bagchi , 'The Professional' , Portfolio Publishing, 2011, USA</li> </ol>	
<b>Reference Books and Web References:</b>	
<ol style="list-style-type: none"> <li>1. Nira Konar, Communication Skills for Professionals, PHI Learning, 2009, New Delhi</li> <li>2. Robert J Dixon, Everyday Dialogues in English, 1988, Prentice Hall India Learning Private Limited.</li> <li>3. Dr. K.Alex, Soft Skills Know Yourself &amp; Know The World, 2011, Generic.</li> <li>4. Michelle N Halsey Pmp, Top 10 Soft Skills You Need: 90-Minute Guide, 2017, Silver City Publications &amp; Training, L.L.C.</li> <li>5. G R K Murty, Soft Skills for Success, 2016, 1st Edition, VIVA BOOKS - ORIGINALS.</li> <li>6. Marshall B. Rosenberg, Nonviolent Communication: A Language of Life: Life-Changing Tools for Healthy Relationships, 2015, 3rd Edition, Puddle Dancer Press.</li> </ol>	

<b>TYL S3 – Soft Skills-3</b> <b>(Effective from the academic year 2018 -2019)</b> <b>SEMESTER – VI</b>			
<b>Course Code</b>	<b>18TYLS3</b>	<b>CIE Marks</b>	<b>0</b>
<b>Number of Contact Hours/Week</b>	<b>1</b>	<b>SEE Marks</b>	<b>100</b>
<b>Total Number of Contact Hours</b>	<b>12</b>	<b>Exam Hours</b>	<b>NA</b>
<b>CREDITS –1</b>			
<b>Course Learning Objectives:</b>			
<ul style="list-style-type: none"> <li>➤ To make the students aware of the importance of Group Discussion and Personal Interview.</li> <li>➤ To help students eradicate fear about Group Discussion and Personal Interview.</li> <li>➤ To train the students develop the required skills to effectively interact with people and to articulate their ideas.</li> <li>➤ To encourage students to achieve synergy.</li> <li>➤ To make students ready for reputed companies with higher packages.</li> </ul>			
<b>Modules</b>			<b>Contact Hours</b>
<b>Module 1</b>			
<b>Introduction &amp; Resume Evaluation:</b> Resume Evaluation, Video Resume Evaluation			<b>4</b>
<b>Module 2</b>			
<b>Group Discussion:</b> Introduction, Objectives, Types of GD Topics, Do's and Don'ts in GD, Tips to handle a GD Topic, making one's own presence Conspicuous in GD, Mock GD Giving topics on current affairs			<b>4</b>
<b>Module 3</b>			
<b>Interview Skills</b> Introduction, Types of Interviews, How to structure thought in an interview, Do's and Don'ts in the interview, Dress code, Preparation for interviews, Mock interview based on the case studies of reputed companies			<b>4</b>
<b>Course Outcomes:</b> The student will be able to			
<ol style="list-style-type: none"> <li>1. Prepare high quality resumes</li> <li>2. Participate in Group Discussion and Personal Interviews effectively</li> <li>3. Attend Technical and HR interviews with confidence</li> <li>4. Communicate effectively with Interviewers.</li> <li>5. Showcase professionalism throughout the hiring process</li> </ol>			
<b>Question Paper Pattern &amp; Evaluation Method:</b>			
Students are assessed as per the following parameters <ul style="list-style-type: none"> <li>● GD 1                      20 marks</li> <li>● GD 2                      20 marks</li> <li>● Personal Interview   20 marks</li> <li>● HR/MR Interview    20 marks</li> <li>● Initiatives              20 marks</li> </ul>			
Maximum Marks - 100 Marks, Minimum marks for passing - 50 Marks			
<b>Textbooks:</b>			

1. Mouna Muthamma C. P, TYL Soft skills Workbook V1, 2021, CMRIT Publications
2. 'Seven Habits of Highly Effective People' by Stephen Covey, Pocket Books, 2004, New York
3. Subhratho Bagchi , 'The Professional' , Portfolio Publishing, 2011, USA

<b>Reference Books and Web References:</b>	
<ol style="list-style-type: none"> <li>1. Nira Konar, Communication Skills for Professionals, PHI Learning, 2009, New Delhi</li> <li>2. Robert J Dixon, Everyday Dialogues in English, 1988, Prentice Hall India Learning Private Limited.</li> <li>3. Dr. K.Alex, Soft Skills Know Yourself &amp; Know The World, 2011, Generic.</li> <li>4. Michelle N Halsey Pmp, Top 10 Soft Skills You Need: 90-Minute Guide, 2017, Silver City Publications &amp; Training, L.L.C.</li> <li>5. G R K Murty, Soft Skills for Success, 2016, 1st Edition, VIVA BOOKS - ORIGINALS.</li> <li>6. Marshall B. Rosenberg, Nonviolent Communication: A Language of Life: Life-Changing Tools for Healthy Relationships, 2015, 3rd Edition, Puddle Dancer Press.</li> </ol>	