M.Sc. Degree Programme in Computer Science – List of Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title of the Courses</th>
<th>Core/ Elective</th>
<th>Credits L-T-P-C</th>
<th>Course Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
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<tr>
<td>MSIC401</td>
<td>Mathematics for Computer Science</td>
<td>C</td>
<td>3-1-0-4</td>
<td>P. Thangavel / Guest Faculty(G.F.)</td>
</tr>
<tr>
<td>MSIC402</td>
<td>Design and Analysis of Algorithms</td>
<td>C</td>
<td>3-1-0-4</td>
<td>P. Thangavel</td>
</tr>
<tr>
<td>MSI C403</td>
<td>Database Management Systems</td>
<td>C</td>
<td>3-1-0-4</td>
<td>B. Lavanya</td>
</tr>
<tr>
<td>MSIC404</td>
<td>Computer Graphics</td>
<td>C</td>
<td>3-1-0-4</td>
<td>PL. Chithra</td>
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<tr>
<td>MSIC405</td>
<td>Database Systems and Computer Graphics Lab.</td>
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<td>0-0-2-2</td>
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<tr>
<td>Elective</td>
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<td>MSIC406</td>
<td>Computer Networks</td>
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<td>P. Thangavel</td>
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<tr>
<td>MSIC407</td>
<td>Theory of Computation</td>
<td>C</td>
<td>3-1-0-4</td>
<td>M. Sornam/G.F.</td>
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<tr>
<td>MSI C408</td>
<td>Digital Image Processing</td>
<td>C</td>
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<td>MSI C409</td>
<td>Digital Image processing Lab.</td>
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<td>MSI C410</td>
<td>Mini Project and Group Discussion</td>
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<td>MSI C411</td>
<td>Soft Computing</td>
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<td>MSIC412</td>
<td>Cryptography</td>
<td>C</td>
<td>3-1-0-4</td>
<td>P. Thangavel/ M. Sornam/GF</td>
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<td>MSIC413</td>
<td>Big Data and Analytics</td>
<td>C</td>
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<tr>
<td>UOMI001</td>
<td>Internship-I</td>
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<td>2-0-0-2</td>
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<td><strong>Fourth Semester</strong></td>
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<tr>
<td>MSIC414</td>
<td>Project Work</td>
<td>C</td>
<td>0-0-15-15</td>
<td>All Faculty</td>
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</table>
Additional list of Elective courses for M.C.A. and M.Sc. Computer Science:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title of the Courses</th>
<th>Elective</th>
<th>Credits</th>
<th>Course Faculty</th>
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<tbody>
<tr>
<td>MSIE401</td>
<td>Programming in Java and Web Technology</td>
<td>C</td>
<td>2-1-1-4</td>
<td>Guest Faculty (G.F.)</td>
</tr>
<tr>
<td>MSIE402</td>
<td>Microprocessors and Embedded Systems</td>
<td>E</td>
<td>3-0-0-3</td>
<td>S. Gopinathan</td>
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<tr>
<td>MSIE403</td>
<td>Data Mining and Data Warehousing</td>
<td>E</td>
<td>3-1-0-4</td>
<td>B. Lavanya</td>
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<tr>
<td>MSIE404</td>
<td>Software Engineering</td>
<td>E</td>
<td>3-1-0-4</td>
<td>S. Gopinathan</td>
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<tr>
<td>MSIE326</td>
<td>Mathematics for Computer Science</td>
<td>E</td>
<td>3-1-0-4</td>
<td>P. Thangavel</td>
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</table>

**Detailed Course Contents**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title of the Courses</th>
<th>Elective</th>
<th>Credits</th>
<th>Course Faculty</th>
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<tr>
<td>MSIC401/MSIE326</td>
<td>Mathematics for Computer Science</td>
<td>3</td>
<td>1</td>
<td>0</td>
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</tbody>
</table>

Unit I: Set theory: Operations on sets – Basic set identities – Relations and orderings – Functions.


**Text Books:**


**Books for Reference:**

UNIT I: Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

UNIT II: Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and biconnected components. Divide and conquer: General method, applications - Binary search, Quick sort, Merge sort, Strassen’s matrix multiplication.


UNIT IV: Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles. Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution. NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook’s theorem.

TEXT BOOK:

REFERENCES:
storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree .


TEXT BOOKS

REFERENCES

MSIC404 Computer Graphics 3 1 0 4 PL. Chithra


Text Book:
Reference books:
DBMS Lab: Design of scientific calculator with memory - student information system - employee payroll system - inventory control system - railway reservation/cancellation system - hospital management system - library management system - bank loan operational system. Graphics Lab.: Different fills style and draw the different simple figures - Using different fonts and display different messages - Draw a line using DDA (digital differential analyzer algorithm) - Draw a line using Bresenham’s line drawing algorithm - Draw a circle and ellipse using bresenham’s algorithm - Generate a character using line drawing algorithm and bitmap method - Using 2D technique - Draw the following: Translation, Rotation, Scaling, Sheering, Reflection (mirroring object) - Using clipping algorithm draw the following Line and Polygon - Using color techniques draw the following: HSV to RGB, RGB to HSV

<table>
<thead>
<tr>
<th>MSIC405</th>
<th>Database Systems and Computer Graphics Lab.</th>
<th>0</th>
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<tr>
<th>MSIC406</th>
<th>Computer Networks</th>
<th>3</th>
<th>1</th>
<th>4</th>
<th>P. Thangavel</th>
</tr>
</thead>
</table>


Unit II: Data link layer Design issues - error detection and correction - elementary data link protocols - sliding window protocols - Packet over SONET- ADSL. MAC sublayer protocols.

Unit III: Network layer-design issues – Routing and congestion control algorithms, Quality of service, internetworking - Network layer in the INTERNET.


Reference Books
(ii) F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wesley.

<table>
<thead>
<tr>
<th>MSIC407</th>
<th>Theory of Computation</th>
<th>3</th>
<th>1</th>
<th>4</th>
<th>M. Sornam</th>
</tr>
</thead>
</table>


UNIT II : Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of
Automata.


UNIT IV : Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM. A language that is not Recursively Enumerable (RE) – An undecidable problem RE – Undecidable problems about Turing Machine – Post’s Correspondence Problem – The classes P and NP.

TEXT BOOK:

REFERENCES:


Unit-II: Color Image processing – color models – pseudo color Image processing – Smoothing – Sharpening – Color transformation - Color segmentation

Unit III: Wavelets – Multiresolution Processing – Image compression models – Lossy compression – Image Compression standards

Unit IV: Image segmentation – Edge Linking – Boundary Detection – Thresholding – Region Based segmentation by morphological watersheds

Text book:

Reference:

<table>
<thead>
<tr>
<th>MSIC410</th>
<th>Mini Project and Group Discussion</th>
<th>0</th>
<th>0</th>
<th>2</th>
<th>2</th>
<th>All Faculty</th>
</tr>
</thead>
</table>

Each student will take a specific problem for the Mini Project and solve it using any one of latest tool and submit a report. Further each student will participate in regular group discussion.

<table>
<thead>
<tr>
<th>MSI C411</th>
<th>Soft Computing</th>
<th>3</th>
<th>1</th>
<th>0</th>
<th>4</th>
<th>M. Sornam</th>
</tr>
</thead>
</table>


Text Books

Reference Books

| MSI C412 | Cryptography | 3 | 1 | 0 | 4 | P. Thangavel/ M. Sornam |
Unit I: Conventional Encryption: Classical encryption techniques – Block ciphers and DES – Polynomial arithmetic – Finite fields of the form $\text{GF}(2^n)$ - Introduction to AES.
Unit III: – Public key cryptosystems – RSA algorithm - Diff – Hellman key exchange – Elgamal cryptographic system – Elliptic curve arithmetic and cryptography
Unit IV: Hash functions- Hash functions based on cipher block chaining - Secure Hash algorithms (SHA) – SHA-3 - Message authentication requirements – Authentication functions - Message authentication codes (MAC) based on hash functions, and block ciphers – Introduction to Digital signatures, authentication, and key management.

Text books:

Reference Books:


Text book:
References:

1. Michael Minelli, Michele Chambers, 2013, Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today’s Businesses, Wiley CIO
4. Foster Provost, Tom Fawcett, 2013, Data Science for Business, SPD.

Each student will do a project work and submit report of their work done.


Text books:

Reference Books
1. J. Lewis, W. Loftus, Java Software Solutions, Addison-Wesley, 2007
2. P. Deitel and H. Deital, Java for programmers, Pearson, 2009

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Theory</th>
<th>Practicals</th>
<th>Credits</th>
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<tbody>
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<td>MSIE402</td>
<td>Microprocessors and Embedded Systems</td>
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<td>3</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S. Gopinathan</td>
</tr>
</tbody>
</table>


Unit II: 8051 Architecture and C51 Assembly Language Programming 8051 Architecture - Oscillator, Clock, Internal memory and RAM, SFRs, Internal ROM, I/O pins and ports - External memory, Counters and Timers, Serial Data I/O, Interrupts, Assembly language instructions, Data operations, logical operations, arithmetic operations, Program control, Configuration and programming of 8051 Ports, Timers and Interrupts - Interfacing 8051 with LEDs, Keypad and 7-Segment Display and programming - Interfacing with LCD and programming - Interfacing with ADC and programming - Serial Data Communication programming. Embedded C: Embedded Software development using C - Porting 8051 Assembly code to C - Cross compilation, Downloading, Testing, Debugging.

Unit III: Design of Embedded Systems - Problem definition, requirements and specifications - Software planning - Hardware design and software design. Mini Project - Flexible timings for the project work - To be done on the hardware kit or else you can design your own hardware on breadboard or GP board. Design challenge would cover most of the concepts learned in the training period.

Text books:

Reference books:
2. D. V. Hall, Microprocessors and Interfacing: Programming and Hardware, 4/e, TMH, 2008.

<table>
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<tr>
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<tr>
<td>MSIE403</td>
<td>Data Mining and Warehousing</td>
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<td>4</td>
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<tr>
<td></td>
<td></td>
<td>B. Lavanya</td>
</tr>
</tbody>
</table>

UNIT I: Why preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

UNIT II: Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases-
Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based

UNIT III: Other Classification Methods- neural network based, genetic algorithm- decision tree – CART-Prediction, Classifier Accuracy-Cluster Analysis-Types of data, Categorization of methods, Partitioning methods, Outlier Analysis- web mining - methods and algorithms-Applications and Trends in Data Mining – Introduction to data mining software and usage.


TEXT BOOK

REFERENCES

MSIE404 Software Engineering 3 1 0 4 S. Gopinathan


Text Books:
Reference Books: