CSE Course Engagement Tools

- **Google LM - https://notebooklm.google/**
- **bolt.new (or)**
- **loveable.dev**

Programming for Problem Solving 1 & 2 (24CSEN1031, 24CSEN1041)

Online IDEs & Coding Platforms:

Replit: https://replit.com/

Collaborative coding environment with C/C++/Python support

OnlineGDB: https://www.onlinegdb.com/

C/C++ compiler with debugging features

CodeChef IDE: https://www.codechef.com/ide

Multi-language support with problem-solving integration

Gamified Learning:

CodeCombat: https://codecombat.com/

Learn programming through RPG-style gameplay

CodinGame: https://www.codingame.com/

Programming puzzles and competitions

HackerRank: https://www.hackerrank.com/domains/c

C programming challenges with ranking system

Algorithm Visualization:

VisuAlgo: https://visualgo.net/en

Interactive algorithm and data structure visualizations

Algorithm Visualizer: https://algorithm-visualizer.org/

Step-by-step algorithm execution visualization

Graph Theory Tools:

GraphOnline: https://graphonline.ru/en/

Interactive graph creation and algorithm visualization

Truth Table Generator:

https://web.stanford.edu/class/cs103/tools/truth-table-tool/ Interactive truth table creation

Programme Core Courses

Data Structures (24CSEN2001)

Visualization Platforms:

Data Structure Visualizations: https://www.cs.usfca.edu/~galles/visualization/Algorithms.html University of San Francisco's algorithm animations

Algorithm Tutor: https://algorithmtutor.com/Data-Structures/ Step-by-step data structure operations

Interactive Coding:

LeetCode: https://leetcode.com/problemset/all/?topicSlugs=array%2Clinked-list%2Cstack%2Cqueue Data structure implementation problems

GeeksforGeeks Practice: https://practice.geeksforgeeks.org/explore?page=1&category[]=Data%20Structures Comprehensive data structure problems

Memory Visualization:

Python Tutor: http://pythontutor.com/ Visualize code execution and memory allocation

Operating Systems (24CSEN2011)

OS Simulators:

OS Simulator: https://teach-sim.com/os/ Process scheduling, memory management simulation

Virtual Environments:

VirtualBox: https://www.virtualbox.org/ Free virtualization platform for OS experimentation

Linux Container Playground: https://labs.play-with-docker.com/ Browser-based Linux environment

Interactive Learning:

Operating Systems: Three Easy Pieces:

http://pages.cs.wisc.edu/~remzi/OSTEP/ Free online textbook with simulators

OS Concept Simulator:

https://www.javafxacaric.com/operating-systems-simulator/ Java-based OS concept demonstrations

Logic Games:

Nand Game: https://nandgame.com/

Build a computer from NAND gates step-by-step

Turing Complete: https://turingcomplete.game/

Game about building computers from logic gates

Truth Table Tools:

Boolean Algebra Calculator:

https://www.dcode.fr/boolean-expressions-calculator Boolean expression simplification and truth tables

Competitive Programming:

Codeforces: https://codeforces.com/

Algorithm competitions and practice problems

AtCoder: https://atcoder.jp/

Japanese competitive programming platform

Database Management Systems (24CSEN2031)

Database Design Tools:

ERDPlus: https://erdplus.com/

Online ER diagram creation and database design

Lucidchart Database:

https://www.lucidchart.com/pages/database-diagram/database-design Professional database modeling tool

dbdiagram.io: https://dbdiagram.io/home

Database schema design and visualization

SQL Practice Platforms:

SQLBolt: https://sqlbolt.com/

Interactive SQL tutorial with exercises

W3Schools SQL:

https://www.w3schools.com/sql/trysql.asp?filename=trysql_select_all Try SQL statements online

SQL Murder Mystery: https://mystery.knightlab.com/

Learn SQL through detective game

Database Simulators:

DB Fiddle: https://www.db-fiddle.com/

Online SQL database playground

SQLiteOnline: https://sqliteonline.com/

Browser-based SQLite environment

Protocol Analysis:

Wireshark: https://www.wireshark.org/

Network protocol analyzer

Wireshark Tutorial:

https://www.wireshark.org/docs/wsug_html_chunked/ Official Wireshark user guide

UML Design Tools:

Draw.io (now diagrams.net): https://app.diagrams.net/

Free UML diagram creation tool

https://staruml.io/

PlantUML: https://plantuml.com/

Text-based UML diagram generator

Lucidchart UML:

https://www.lucidchart.com/pages/uml-diagram-tool Professional UML modeling tool

OOP Concept Visualizers:

Java Visualizer: https://cscircles.cemc.uwaterloo.ca/java_visualize/

Visualize Java program execution and object relationships

Track-Specific Courses

Artificial Intelligence Track

Artificial Intelligence (24CSEN2151)

AI Development Platforms:

- **Jupyter Notebooks**: https://jupyter.org/
  Interactive AI development environment
- **Google Colab**: https://colab.research.google.com/
  Free GPU-enabled Python notebooks

AI Game Competitions:

- **AI Challenge**: http://aichallenge.org/
  Programming AI agents for games
- **Kaggle Competitions**:
  https://www.kaggle.com/competitions Machine learning competitions

Machine Learning (24CSEN2161)

ML Platforms:

- **Scikit-learn**: https://scikit-learn.org/stable/
  Python machine learning library with tutorials
  https://www.automl.org/automl/

Interactive ML:

- **Teachable Machine**:
  https://teachablemachine.withgoogle.com/ Create ML models without coding
- **ML Playground**: https://ml-playground.com/
  Experiment with different algorithms visually

Dataset Repositories:

- **UCI ML Repository**:
  https://archive.ics.uci.edu/ml/index.php Standard datasets for ML experiments

Kaggle Datasets:

https://www.kaggle.com/datasets

Community-contributed datasets

Data Visualization (24CSEN2191)

Visualization Libraries:

D3.js: https://d3js.org/

Data-driven documents for web-based visualizations

Plotly: https://plotly.com/

Interactive plotting library for Python/R/JavaScript

Observable: https://observablehq.com/

Interactive data visualization notebooks

Cyber Security Track

Cryptography and Security (24CSEN2081)

Cryptography Tools:

CrypTool: https://www.cryptool.org/en/

Comprehensive cryptography learning platform

Crypto Interactive:

https://cryptointeractive.com/ Interactive cryptography demonstrations

Cipher Simulators:

Cipher Challenge:

https://www.cipherchallenge.org/ Historical cipher breaking challenges

Cryptanalysis Tools:

https://www.dcode.fr/tools-list Online cryptanalysis toolkit

Cyber Security (24CSEN2201)

Security Training Platforms:

TryHackMe: https://tryhackme.com/

Gamified cybersecurity training

HackTheBox:

https://www.hackthebox.eu/

Penetration testing labs

OverTheWire:

https://overthewire.org/wargames/

Security-focused war games

Vulnerability Scanners:

Nmap: https://nmap.org/

Network discovery and security auditing

Software Engineering (24CSEN1021)

Project Management: Will be covered in Day 3

GitHub: https://github.com/

Version control and collaborative development

Jira: https://www.atlassian.com/software/jira

Agile project management tool

Trello: https://trello.com/

Kanban-style project organization

This comprehensive list provides specific, actionable tools with direct links for each course in the GITAM CSE curriculum. Each tool is selected based on its educational value, accessibility, and relevance to the course objectives.

GAME building for your use-case!!