

**COMP3222/9222 Digital Circuits & Systems**

10. Course Wrap-up

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# Outline

- Learning objectives
- Topic list
- Assessment
- Exams
- Reminders **Assignment Project Exam Help**
- myExperience

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# Learning objectives

- How to design and analyze digital logic circuits
  - Boolean algebra, logic minimization, combinational logic components, sequential circuits, simple systems
  - Boolean logic theorems, Karnaugh maps, Shannon's theorem, Moore & Mealy FSMs, ASMs
  - cost, speed, power, understandability, maintainability
  - fine-grained parallelism
  - implementation technologies
- How to specify/simulate/synthesize/implement designs
  - VHDL hardware description language
  - simulation techniques to verify the correct working of our designs
  - logic compilers to synthesize the hardware blocks of our designs
  - implementing designs using programmable hardware
  - testing hardware implementations of circuits

# Topic list – Digital circuits

- Boolean algebra
- SOP & POS form
- NAND/NOR-only forms
- Implementation technologies
- Logic/circuit minimization; circuit cost
- Factoring & functional decomposition
- Analyzing circuits
- Number representation
- Arithmetic circuits; circuit speed
- Combinational circuit blocks
- Implementing combinational functions using MUXes, DECoders & LUTs
- Latches & flip-flops
- Counters, registers
- Timing properties & analysis of digital circuits
- Synchronous sequential circuit design involving FSMs, state transition diagrams, state tables, state minimization, state assignment etc.
- Moore & Mealy models
- Algorithmic state machines
- Digital system design; datapath and control path design
- Hardware handshakes

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# Topic list – VHDL

- Entities & architectures
- Concurrent/sequential statement types; differences with sequential programming language semantics
- Describing combinational & sequential circuit components
- Structural vs behavioural description
- Use of sub-components in structural descriptions
- Packages
- Understanding the three types of reliably synthesizable processes
- Specifying FSMs
- Specifying datapaths
- Describing complete digital systems comprising both data and control paths

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Experience with a CAD tool for synthesizing & simulating designs

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Experience implementing and testing circuits on an FPGA prototyping board

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# COMP3222/9222 **Assessment** details

- Assessment:
  - Lab exercises: 40%
  - 4 fortnightly quizzes: 20%
  - FINAL ONLINE THEORY & PRACTICAL EXAMS:  
Assignment Project Exam Help  
2:00 – 6:30pm, MONDAY 30 NOVEMBER
    - 1 hr Final Theory Test: 15%
    - 2 hr Final Practical Test: 25%  
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you must score >40% in this part to pass the course

# COMP3222 Exams

## Final Theory exam

- Available on Moodle from 2:00 – 3:30 pm on Monday 30 Nov
- Time allowed: 80 minutes, including approximately 10 minutes reading time and 10 minutes to upload files with minor network glitches – commence ASAP after 2:00 pm to get full 80 minutes
- Suggest you be logged into Moodle by 1:55 pm; refresh your session after 2:00 pm to commence the exam  
<https://tutorcs.com>  
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- The exam comprises 3 long answer questions; split into multiple subquestions; some involve uploading scanned copies of written work
- Please try the **Practice Theory exam** (from the Exams menu item on the course website) to familiarize yourself with the rules, the style of questions, and file uploads using Moodle

# COMP3222 Exams

## Final Practical exam

- Available on WebCMS from 4:00 – 6:30 pm on Monday 30 Nov
- Time allowed: 140 minutes, including approximately 10 minutes reading time and 10 minutes to upload files with minor network glitches – commence ASAP after 4:00 pm to get full 140 minutes
- Suggest you be logged into WebCMS by 3:55 pm; refresh your session after 4:00 pm to commence the exam  
<https://tutorcs.com>  
Assignment Project Exam Help  
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- The exam comprises 4 long answer questions; three involve uploading scanned copies of written work; the fourth involves submitting a Quartus project archive of your implementation
- Please try the **Practice Practical exam** (from the Exams menu item on the course website) to familiarize yourself with the rules, the style of questions, and file submissions using WebCMS

# Exam details

READ THE INSTRUCTIONS!!

## Theory Part

- Covers all lecture material
- Will comprise design questions
- ANY OFFLINE MATERIALS ALLOWED INCLUDING MATERIAL ON THE COURSE WEBSITE

<https://tutorcs.com>

## Practical Part

- Will require you to design and implement a small digital system
- ALLOWED TO USE ANY OFFLINE REFERENCE MATERIALS INCLUDING MATERIALS ON THE COURSE WEBSITE AND LAB FILES
- ASKING FOR HELP OF ANYONE OR USING THE INTERNET TO ASSIST OR COPYING ANY EXAM MATERIAL IS NOT PERMITTED
- Contact me by phone, email or Teams if you have any questions or difficulties
- Take screen images, obtain reports of network outages etc.
- Lodge request for special consideration and submit evidence if impacted

# Reminders

- Today is the last lecture
- LAB11 is due next Monday
- Stay tuned for an announcement on returning your lab kit
  - Failure to return the lab kit when requested may result in delayed results or a service block being imposed on your record

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# Please fill in the myExperience Course Survey

Your opinions are important to us

- Course surveys help! We do take notice and make changes to improve quality

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So PLEASE take 10 mins NOW and tell us what you thought of the course

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Thanks! & Good Luck!



**Tell us about your experience  
and shape the future of  
education at UNSW.**



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**Click the link in Moodle**



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