1ST EDITION

HOW TO 1ST YEAR

YOUR PERSONAL ROADMAP

TASMANIAN UNIVERSITY MEDICAL STUDENTS' SOCIETY

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Congrats!

You have made it through to medical school! It has been a difficult journey thus far, and you are on the penultimate stage to becoming a person of medicine. To say that it will be easier will be a lie. There are still many things to learn, experience and practice before you can start treating your future patients.

As you have come this far, you are all capable of passing this stage. But do not stress if you are finding it difficult to do something or if it has been very difficult to understand a concept or if it is difficult for you to find help. The most important resource you have is your fellow med students and your lecturers and tutors. Always put up your hand if you have a question, always ask for help if you need it.

This guide will help you study the content you need to learn and be prepared for exams. Compiled by previous 1st year med students, it is what we find the most useful and important things to know. This contains high yield, highly examinable points, handy resources, and study tips and tricks! The course does change a little bit year to year, but we will try to make it as up to date as possible.

Best of luck!

- TUMSS

xoxo

The Team

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Layout of the year:

The 1st year course (and 2nd) is divided into 5 domains:

- ### Science & Scholarship Domain (1)

This domain is the 'sciency stuff' of medicine such as histology, biology, anatomy etc.

- ### Clinical Practice Domain (2)

This domain focuses on doctor-patient interactions and examinations i.e. how to talk to a patient, what questions to ask, how to conduct a joint exam etc.

- ### Health & Society Domain (3)

Also known as Public Health, the greater impacts of medicine beyond the surgery room/ office is explored.

- ### Professionalism & Leadership Domain (4)

Ethics, the idea of medicine as a profession, the rules that dictate patient-doctor relationships and boundaries are covered in this domain.

- ### Case Based Learning Domain (5)

Mostly with a tutor, you will practice how doctors think and behave. All the other domains will play a role in this domain, as you apply what you learn in asking, examining and later managing the patient.

CAM101:

This semester focuses on helping you orientate to the year. It lays the basic groundwork for many of the concepts and ideas you will need to know for the whole course. It may be a bit boring at times (especially if you have done a different course or high-school biology) but overall this semester is great for getting your head around medical school.

You will be introduce to:

Histology
Pathology
Biochemistry
Cell biology
Nutrition
Gross anatomy
- **Embryology**

Pharmacology
Ethics
Public Health
Immunology
Physiology

Topic	Details
Cell Biology	Cell membrane, cytoskeleton, DNA, RNA, transcription, gene expression, Protein synthesis, signal transduction, cell division, medical genomics and genomic testing.
Histology	Microscopy, cell structure/ultrastructure, Epithelium and glands, connective tissue, Muscle tissue, nervous tissue, Integumentary system, vessels and lymphatics
Biochemistry	Amino acids, proteins, enzymes, carbohydrates, lipids, Metabolism, micronutrients
Microbiology	Bacteria, infection control, Bacterial skin infections, mycology, fungal skin infections, parasitology, parasitic infections, Collection and culture of specimen, gram stain and microscopy
Anatomy & Physiology	gross anatomy, membrane potentials, Musculoskeletal, nervous, endocrine, Lymphatic, cardiovascular, respiratory, digestive, urinary, Reproductive, thermoregulation
Radiology	Medical imaging
Immunology	Immune system, innate immunity, inflamation, immune recognition molecules, plasma, Adaptive immune system, antigen processing/presentation, effector cells, Immune response to microbes, tolerance, autoimmunity, hypersensitivities
Pharmacology	Drug targets, delivery mechanisms, Drug absorption, distribution, elimination
Embryology	Prenatal development, fertilisation to gastrulation, organogenesis, fetal period to birth

The main topic of this semester is **dermatology** however do not be surprised if there is not much focus on this. The main aim of this semester is helping you to adjust to your course.

CAM102:

The focus of this semester is the musculoskeletal system. You will be learning and memorising many things about the muscles and their examinations, while also wrapping up the basic groundwork from last semester. There is a lot to memorise with muscles, but

You will be introduce to:

Statistics and epidemiology
Musculoskeletal & rheumatology examinations
Musculoskeletal anatomy of lower & upper limbs

Immunology

High-Yield/Must-Know

- Acute inflammation response
- Types of hypersensitivity
- Complement system cascade
- MHC 1 & 2 pathways
- Types of T-cells and B-cells
- Adaptive vs Innate response
- Peripheral tolerance vs central tolerance

- Difference between HCMV and EBV
- Complications associated with HCMV, RBV, HHV8
- Key features of an effective vaccine
- Herd immunity and how it can protect a small individuals

Resources

- AK Lectures (on Youtube): really good for biochem and immunology
- Khanacademy: explains cascades really well.
- Google drive: there is a compilation of notes on immunology.
- Osmosis is a really good resource.

Tips/Tricks

- Mnemonics:
    - **Fish To Be EATEn** → Interleukin actions.
      Il-1: **F**ever, Il-2: **T**-cell production, Il-3: **B**one marrow stimulation, Il-4: Class switching to Ig**E**, Il-5: proliferation of **E**osinophils and class switching to Ig**A**, Il-6: **T**emperature **E**levation

Pathology

High-Yield/Must-Know

- Cellular adaptation (Hypertrophy, Hyperplasia, atrophy, metaplasia)
- Cellular injury - flow chart
- Cellular death
- Necrosis
- Regeneration
- Fibrosis
- Inflammation response
- Histology of disease states
- Brittle bone disease
- Osteogenesis
- Bone healing: resolution, regeneration
- Rheumatoid arthritis

Resources

- Pathology museum; you can access this online and in person
- A detailed summary of each disease will be provided by the lecturer in her notes.

Tips/Tricks

- Mnemonics:
- Try to know the pots reasonably well, they are reused for exams. Use ankis with pictures of the pots if possible.
- Use the lecture notes, along with stars about how relevant it is for the exam. Focus revision on this (especially 4* and up)
- Take pictures of the pictures at pathology practicals

Microbiology

High-Yield/Must-Know

- MCQs: shapes of bacteria
- Applied: know causative agent, mode of transmissions, presentations, organism, symptoms, pictures
- Differences between African & American tryptomyosis
- Lab diagnosis?
- Practical photo and cases, they will be reused for exam

Resources

- Osmosis (has good microbio notes) but $$$

Tips/Tricks

- Mnemonics:
    - **Head, Beard, Feet**
      Tinea Capitis - skull **CAP**, Tinea barbae - B for **beard**, Tinea pedis - Bi**pedal**: humans walk on feet
- Anki: use the exact photos from slides
- Summarise all the conditions in the lectures into one table
    - Put high yield on table (e.g. causative agent)
- Try to memorise the high yield content **BUT**
- Don't bother memorising treatment, you will not be tested
- Learn it by presentation - especially the ones mentioned on the lecture slides. Try to remember the common groups/situations where people might get the disease (e.g. ppl in swimming pools most likely = hot tub folliculitis)
- One way to do flashcards is to put disease + causative agents on one side and all the other information on the other side.. Trying to remember the causative agent and disease when presented with the history/images and then once you're good at that you can try and come up with the history/clinical features when presented with the disease/agent.

Biochemistry

High-Yield/Must-Know

CAM101

- Protein transcription & translation
- Compare & contrast proteins, carbs, lipids
- Lipid mode of transport (HDL, LDL, VLDL, chylomicrons)
- ATP, NADH and FADH production at each stage of metabolism
- ATP produced for fatty chains

CAM102

- Protein structure, different types of proteins, carbohydrates.
- LEARN BLOOD GLUCOSE CONTROL - INSULIN & GLUCAGON
- Diabetes type 1 vs type 2 vs diabetes insipidus
- Type 1 DM: remember its autoimmune, and the different symptoms e.g. polyphagia, ketoacidosis, polyuria etc. (and the progression of symptoms)
- Type 2 DM: learn the DM progression curve in one of the lectures.
- Insulin resistance.
- Metabolic syndrome vs type 2 DM
- Energy production - carbs vs protein vs fat

Resources

- Marieb and Hoehn any edition.

Tips/Tricks

- Do the questions at the end of her lectures - sufficient revision for exams.
- Youtube videos are excellent.
- ILO are commonly used as exam questions.

Pharmacology

High-Yield/Must-Know

- Basic definitions; e.g. drug targets, drug delivery, absorption, volume of distribution, first-pass metabolism, difference between pharmacokinetics and pharmacodynamics, bioequivalence.
- Urinary alkalisation/acidisation (ion-trapping)
- cAMP amplification cascade
- Agonists vs antagonists (competitive and non-competitive, reversible & irreversible)

Resources

- Rang & Dale Pharmacology - basic chapters & texts are enough.
    - Any textbook is sufficient - but the lectures are more than enough as specific drugs aren't explored in 1st year.

Tips/Tricks

- Flashcards (make your own - easy to test yourself).
- The pharmacology questions Bonnie puts at the end of lectures are very useful and were quite similar to the exam questions.
- Mnemonics
    - Drug targets
        - **RICE** (Receptors, Ion channels, Carrier transporter proteins, Enzymes)
    - Pharmacokinetics
        - **ADMET** (Absorption, Distribution, Metabolism, Excretion, Toxicity)

Cell Biology

High-Yield/Must-Know

- Mutations from changes in DNA sequence
- Directions of strands for 'double helix' replication
- Base pairing
- Transcription and factors
- Translation

Resources

- Marieb and Hoen
- Youtube videos
- Khan Academy

Tips/Tricks

- Look at suggested answer scheme for formative exams for both mid-sems and end-sem, past questions have come out exactly the same for actual exams

Nutrition

High-Yield/Must-Know

- Main nutrition targets for each age group
    - E.g. Pregnancy; Folate and B12 importance, iron
    - Eg. importance of nutrition in the elderly (osteoporosis especially)
- Australian dietary guidelines and 5 food groups

Resources

- Nutrition From Science To You textbook

Tips/Tricks

- Mnemonics:
    - **DASH**: **D**ietery **A**pproaches to **S**topping **H**ypertension

- Use common sense + follow ILOs

Histology

High-Yield/Must-Know

- Sharpey's fibres
- Osteoblasts vs osteoclasts vs osteocytes
- Sensor receptors
- Differences in glands: describe and distinguish
- Mucus vs serous vs mixed type salivary glands (Jamie has a nice histology video for this on his Youtube)
- Differences in muscles
- Differences in vessels - artery (muscular vs elastic) vs arteriole vs capillary vs venule vs vein

Resources

- Digital Slidebox: UTAS runs this
- Jamie's histology channel on Youtube. His twitter is cringy but funny. https://www.youtube.com/channel/UCvSvCkHjCbHn8aGd6OPno_A/videos
- https://twitter.com/Chapman_Histo?ref_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor

Tips/Tricks

- Mnemonics:
  - **C**ome, **L**et's **G**et **S**un **B**urned - stratum **C**orneum, stratum **L**ucidum, stratum **G**ranulosum, stratum **S**pinosum, stratum **B**asale
- Learn how to use microscopes well. For exams, they can be very time consuming
- Learn the suffixes Epi- vs Peri- vs Endo. Almost all structures have these layers.
- ILO are commonly used as exam questions.

Embryology

High-Yield/Must-Know

- Blood circulation of a foetus
- Which organ develops from which embryonic layer (endoderm, mesoderm, ectoderm)

Resources

Crashcourse to see development from fertilised ovum to full-term fetus
Khan Academy

Tips/Tricks

- Mnemonics:
- Remember the details: this is not a subject you can remember the general motions of.
- There will always be a question on the circulation of a foetus.
- Do the review questions after each lecture.

Statistics & Epidemiology

High-Yield/Must-Know

- Differences in studies i.e. control, prospective cohort, case control etc.
- Disadvantages and advantages of studies
- P-values and confidence intervals.
- Confounding
- Bias, where it can originate and how it can affect the study
- Null hypothesis + alternate hypothesis and their definitions
- How to reject or not reject null hypothesis (THERE IS NO ACCEPTING HYPOTHESIS)

Resources

- Search up the differences in studies, there will be good videos and tables online.

Tips/Tricks

- Mnemonics:
- Go to the tutorials, as the work you do will form the foundation of your assignment
- Make sure you understand how to define null/alternative hypothesis, p-value significance and definition, and why you would reject or not reject null hypothesis

Physiology and Neuro

High-Yield/Must-Know

- Excitation-Contraction coupling
- Sliding filament mechanism for muscles
- Action potentials
- How reflexes work
- Difference between nociception and pain
- Difference between pain fibres & how they're activated/relayed to the brain
- Membrane potentials
- Different types of transports and reabsorption of kidneys
- Temperature regulation and the ways to raise/reduce temperature
- Conduction vs convection vs radiation

Tips/Tricks

- Be able to explain why prolonged plateau is advantageous in cardiac vs skeletal muscle (relate to tetanus as well)
- State the stimulus, receptor, control center, effector and action performed in a reflex for each negative feedback loop & transmission between them

Domain 2 - Clinical Skills

High-Yield/Must-Know

- How to establish rapport
- Definitions
    - Tachycardia /bradycardia
    - tachypnea/bradypnea
    - Temperature (normal ranges for oral, rectal, tympanic, temporal for different age groups)
    - Special tests
- How to take a history (and questions you would ask)
- Verbal & non-verbal communication skills

Resources

- Talley and O'Connor
- CAM102 clinical skills booklet proformas

Tips/Tricks

- Mnemonics:
    SOCRATES
    SOLER (Sit squarely, Open posture, Lean forward, Eye contact, Relaxed)
- Remember the proforma. You will rely on this for the rest of your life.

Domain 3 - Public Health

High-Yield/Must-Know

- Explain the life-course model (Jen's lecture)
- Cultural differences (refugees, Aboriginal & Torres Strait Islanders) and resulting health impact.
- Determinants of health and their definitions (also examples of each)
- Health service challenges + determinants of rural and remote populations
- River of prevention analogy (upstream, downstream prevention)
- Equity vs inequality
- DALY

Resources

- End of lecture links

Tips/Tricks

- This domain is all about societal impacts. When trying to answer questions, try to be as holistic as possible.
- Easy marks if you have a background understanding of the lecture

Domain 4 - Professionalism + Ethics

High-Yield/Must-Know

- Be able to describe and give examples for autonomy, justice, beneficence and non-maleficence. Even better if you can explain how they interact with each other. Basically free marks, very likely to come up
- Consent and confidentiality
    - Conscientious objection (abortion, physician-assisted suicide) + refusal of treatment (advanced care directives)
- 6 qualities of professional behaviour
- Calgary Cambridge model
- Clinical images on personal devices

Resources

- Good Medical Practice: Code of conduct
- RACGP
- CrashCourse videos for beneficence*, justice*, utilitarianism*, Kantism, Aristotle values,

Tips/Tricks

There is always a question on professionalism.

Anatomy

High-Yield/Must-Know

- Major neurovasculature for important muscles, including origins & terminations
- Innervations for movements
- Dermatomes and Myotomes
- Femoral triangle (boundaries & contents)
- Boundaries and contents of all canals, tunnels and fossa.
- Lumbar plexus (particularly sciatic nerve, femoral nerve, common fibular nerve, tibial nerve)
- Brachial plexus
- Key landmarks - ASIS, pes anserinus, adductor hiatus, pubic tubercle, tarsal tunnel)
- Anatomical snuffbox (boundaries, contents)
- Axilla (boundaries, contents)
- Carpal bones
- Lymph drainage
- Patella stretch reflex, flexor reflex

Resources

- Teachmeanatomy.com is a brilliant site that is easy to understand (clear, coloured diagrams for each muscle in the given section)
- Complete/Essential Anatomy is a 3D program you can get from people or buy.
- William will share a list of everything you need to know. Use them as a checklist
- Make sure you can differentiate between CT/MRI and identify structures/vessels, especially on arteriograms

Tips/Tricks

Mnemonics:

- **Contents of the femoral triangle → NAVEL**
  Nerve, artery, vein, empty, lymphatics
- **Some Lovers Try Positions That They Can't Handle → carpal bones**
  Scaphoid, Lunate, Triquetrum, Pisiform, Trapezium, Trapezoid, Capitate, Hamate

- **Tom, Dick And Very Naughty Harry → Tarsal tunnel**
  contents of Tarsal tunnel from anterior to posterior, including the artery, vein, nerve.
- **SITS**
  (rotator cuff muscles): Supraspinatus, Infraspinatus, Teres Minor, Subscapularis.
- **Remember To Drink Cold Beer →** subdivisions of brachial plexus
  Roots, Trunks, Divisions, Cords, Branches.
- **Really Need Booze To Be Vaguely At My Nicest → lateral → medial of cubital fossa**
  Radial nerve, biceps tendon, brachial artery (vein), median nerve

- https://en.wikipedia.org/wiki/List_of_anatomy_mnemonics have other useful mnemonics. The above are just the most important and seemed to be repeatedly tested.
- Netter's Flash cards (physical copy)
- Handwriting and drawing out the body parts in a comprehensive way
- Make your own flashcards using ANKI from lecture slides
- Compartmentalise! It is much easier to learn muscles by compartments (i.e. medial compartment of the thigh.) They normally share the same neurovasculature.
- Know the course of each vessel (eg. external iliac artery terminates as femoral artery at inguinal ligament and femoral artery terminates at adductus hiatus to continue on as popliteal artery)

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Good Luck!