*NOTES ABOUT THE USE OF THIS FORM:*

1. *This form is designed to be completed on a computer. Cells in the table below will expand to accommodate any amount of text … but we suggest that you keep the narrative as succinct as possible!*
2. *Please keep the use of formatting to a minimum. Importing formatted text onto a virtual learning platform presents challenges!*
3. *This form assumes that the “unit of learning” is a module. The module, in turn, would be included in a “course” (which is not referred to here). Each module will have a series of components which have been called “units” – they may be called something different in your design (like “weeks”, or “sections”) and you are free to change the terminology.*
4. *In the section about the authors of and contributors to the course, we have provided space for 5 co-authors (or co-contributors). If there were more than six people on the team, please add additional rows to the table.*
5. *Please ensure that you use student-friendly language. So the intended learning outcomes will be framed using the word “you”, and not “the student”. (This may be at odds with what you understand to be “academic” language. The aim, in online and blended learning, is to use language that includes the student to the greatest extent possible.)*
6. *Please note that module-level outcomes should be “overarching” outcomes onto which the unit-level outcomes map. You should have a few (maybe 4) module-level outcomes, and a very few (two or three at the most) unit-level outcomes for each unit.*
7. *The unit-level template should be copied so that there is a copy of the template for EACH unit/week/section. Thus, if there are 15 units/weeks/sections in a module, you will copy the template 14 times and complete each copy for one unit/week/section.*
8. *In the unit-level template, there is a space for a detailed description of student and teacher engagement with the unit. Here we would expect to see a “blow-by-blow” account of how the unit “hangs together”. What happens first? And then? What resources would students need to access for each part of the unit’s work? Where would they find these? Where is collaboration expected to happen? How is it scaffolded? And so on? What happens in class? What happens online? How do these elements build on each other? How long should students spend on each part of the unit?*

*This is NOT a list of things that students (or teachers) do. It is a* ***detailed description*** *of the* ***process****.*

*We have used a generic set of headings in the template. You are free to change the headings to suit the particular unit, but you are* ***not*** *free to ignore any of the required information.*

*Be sure, when completing the unit-level template to contextualise the content … by which we mean that content needs to be grounded in real life – even mathematical equations need to be demonstrably linked to real life! A student needs to know* ***why*** *they are engaging with the content.*

There are 2 templates on the following pages. The **Module-level template**should be completed once, and the **Unit-level template** should be completed in respect of each of the Units (or Sections, or Weeks) in the module

MODULE-LEVEL TEMPLATE

|  |  |
| --- | --- |
| **Details of institution that has developed the module** | |
| Name of University | University of Health and Allied Sciences |
| Name of institutional contact | Prof. Harry Kwami Tagbor |
| Email address of institutional contact | htagbor@uhas.edu.gh |

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| **Details of Creative Commons licence** (<https://creativecommons.org/licenses/>) | |
| Licence type | [**Creative Commons Attribution-NonCommercial 4.0 International**](http://creativecommons.org/licenses/by-nc/4.0/) |

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| **Details of the authors of/contributors to the course and their role** *(You can delete any sections that don’t apply.)* | |
| Original author (if applicable) | **Dr. Donatus Adongo; Dr. Anita Fafa Dartey; Dr Joseph Osarfo** |
| Lead author (+ email address) | **Dr. Donatus Adongo (dadongo@uhas.edu.gh)** |
| *Responsible for:* | **Design and Development** |
| Co-author/co-contributor | **Dr. Anita Fafa Dartey** |
| *Responsible for:* | **Design and Development** |
| Co-author/co-contributor | **Dr Joseph Osarfo** |
| *Responsible for:* | **Design and Development** |

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| **Information regarding format of material to upload onto the OER Africa repository** | |
| Primary resource (Not PDF) | PowerPoint of presentations of lectures. Assessments and laboratory practical contents in word documents. |
| Will a Moodle common cartridge be uploaded as well? | Yes |

*(A Moodle common cartridge is a .ZIP file of your module – if it is created in Moodle – that can be imported into another university’s Moodle platform.)*

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| **Course details** | | | |
| Module title: | Introduction to Pharmacology (SOPH 244) | | |
| Under- or Post-graduate? | Undergraduate | Year of study: | Level 200 |
| Class contact time (hours): | 60 hours:  5 Hours/Week: (theory 2hours, practical 3 hours) for 12 weeks | Number of credits: | 3 (2 Theory  1 Practical) |
| Private/online study hours: | 60 hours (5Hours/Week) | Number of weeks of study: | 15 |
| Total student learning hours: | 120 Hours | Number of units of study: | 12 |

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| Programme(s) which might include this module: | 1. Dentistry 2. General Nursing 3. Medicine 4. Midwifery 5. Pharmacy 6. Physician Assistantship 7. Public Health Nursing |
| Pre-requisite student abilities and knowledge: | You should have basic knowledge and be able to explain;   1. Structure and functions of cells, tissues, organs and systems of the human body. 2. Structure, function and metabolism of biomolecules including proteins, carbohydrates, lipids, enzymes and nucleic acids as well as the role of metabolism in health and disease. |
| Pre-requisite (or co-requisite) modules: | 1. Human Anatomy (SBBS 121) 2. Human physiology 1 (SBBS 119) 3. Human physiology II (SBBS 108) 4. Biochemistry I (SBBS 215) |

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| Aim of the module: | In this module, you would be introduced to the basic concepts in pharmacology, the pharmacological basis of therapeutics, pharmacology of neuro effector systems and local anaesthetic agents. |
| Brief description of module: | We will be exploring the general principles of pharmacology, including pharmacokinetics and pharmacodynamics, where the emphasis will be laid on the basic mechanisms of drug action in relation to both drug-receptor interactions and to the response of physiological and biochemical systems. We will also study autonomic pharmacology and local anaesthetics. This will help the learner acquire core knowledge in basic pharmacology for subsequent application in clinical pharmacy and other related courses in pharmacy.  The course would be delivered via face-to-face engagements (strictly face-to-face for the first four (4) weeks) and on online platforms with pre-recorded lessons on the University’s learning management system (LMS) and Zoom sessions to support learning activities. Laboratory practical sessions and examinations would be by face-to-face engagement. |

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| Intended learning outcomes: | *At the end of this* ***module****, the student would be able to:*   1. Explain basic pharmacological principles that control the actions of drugs in the body. 2. Identify the major classes of drug receptors and sites of drug action within the body; pharmacological mechanisms by which drugs of various classes may alter biochemical, physiological or pathophysiological parameters to produce therapeutic or unwanted effects. 3. Demonstrate an appreciation of pharmacogenomics and the leading position it will occupy in the near future. 4. Explain the biosynthesis, physiological actions of catecholamines and acetylcholine (ACh) and drugs that affect adrenergic and cholinergic transmission. 5. Explain the biosynthesis and physiological actions of non‐adrenergic, non‐cholinergic (NANC) transmitters. 6. Describe the pharmacology of local anaesthetic agents. |
| Indicative content: | 1. Key Concepts in Pharmacology 2. Targets of Drug Action 3. Receptor Theory and superfamilies 4. Pharmacokinetics (PK) 5. Autonomic pharmacology 6. Skeletal Neuromuscular Function 7. Non-Adrenergic, Non-Cholinergic (NANC) transmission 8. Local Anaesthetics and Neurotoxins |
| Form of final/summative assessment: | 1. Quizzes 8% 2. Student Assignment 8% 3. Student presentation 8% 4. Practical Assessment 16% 5. End of Semester Examinations 60% |

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| **Assessment of module-level learning outcomes** | |
| Module-level learning outcome | Module assessment task |
| 1. Explainpharmacology and thebasic pharmacological principles that control the actions of drugs in the body. | * Write a summary (in 300 words) of your understanding of Pharmacology and post on LMS. In this summary, we will be looking out for the definition of Pharmacology from a scientist and a clinician’s point of view. Additionally, we will look at the divisions of Pharmacology and their importance. The relationship with other biomedical disciplines should also feature. * Submit a table of drug classes and their therapeutic effects. * After marking the interim assessment covering units 1-5, we will have a class discussion of salient points arising from the examination. * Marks will be allocated for the PowerPoint presentations students will do on drug metabolism and elimination based on content, structure and communication skills. |
| 1. Identify the major classes of drug receptors and targets of drug action within the body; pharmacological mechanisms by which drugs of various classes may alter biochemical, physiological or pathophysiological parameters to produce therapeutic or unwanted effects. | * A short quiz of 10 questions would be used to test understanding of drug targets in the body. After marking, the answers would be discussed in the class. * Learners working in groups would post summaries of the topic on LMS. There would be a peer review of the posts made. Feedback from the peer review of the summaries posted on LMS would be assessed to determine how well the learners identified at least 3 drug classes and related their mechanisms of action to drug targets. * There would be a laboratory demonstration on dose-response curves using guinea-pig ileum. The criteria for assessing the laboratory reports are documented in the laboratory manual. * Learners would post a 300-word summary of receptor types on LMS. The summary will assess knowledge of ligand-gated ion channels, G Protein-coupled receptors, tyrosine kinase receptors, and nuclear receptors with 3 examples each. * Also, there would be a simulation on dose-response curves and site of drug action using guinea pig isolated ileum. The criteria for assessing the simulation reports have been documented in the laboratory manual. |
| 1. Explain pharmacogenomics and pharmacogenetics and the leading position they will occupy in the near future. | * Learners would submit a 500-word overview of the potential role of pharmacogenetics in cancer treatment, and this will feature the roles of recent clinically-relevant pharmacogenetic testing and gene therapy. * After marking a short quiz on key concepts in pharmacogenetics and pharmacogenomics and their implications on drug development, we will discuss salient points arising. |
| 1. Explain the biosynthesis, physiological actions of catecholamines and acetylcholine (ACh) and drugs that affect adrenergic and cholinergic transmission. | * There would be a presentation to assess the knowledge of learners on the two divisions of the ANS, end-organ response to stimulation of the ANS and its role in homeostasis. * After marking the short quiz on cholinergic agonists and antagonists, the salient points arising from the examination to reinforce learning would be discussed. * The laboratory report on the demonstration of the effect of muscarinic drugs and cholinesterase activity on guinea pig ileum would be assessed based on the criteria set in the appropriate section of the laboratory manual. * Learners would submit an outline of the processes leading from an action potential in a motor nerve to contraction in a muscle. The outline will assess knowledge of relevant elements including storage and release of ACh, binding of ACh to its receptors and action of calcium on muscle contraction. * A quiz covering topics treated from weeks 6-10 would be conducted and answers will be reviewed in class after marking. * There would be a laboratory demonstration of autonomic drugs on the anaesthetised cat and a report will be submitted. The criteria for assessing the laboratory report are documented in the laboratory manual. |
| 1. Explain the biosynthesis and physiological actions of non‐adrenergic, non‐cholinergic (NANC) transmitters. | * Learners would do PowerPoint presentations on the biosynthesis and actions of Nitric Oxide and drugs influencing its effects in the body. Marks will be allocated for the PowerPoint presentations based on content, structure and communication skills. |
| 1. Describe the pharmacology of local anaesthetic agents. | * Learners would watch videos on local anaesthetic agents and post 5 key points they have learnt regarding their mechanisms of action, properties, methods of administration and adverse effects. * Learners would submit a 400-word overview of the actions of neurotoxins. This is to assess the knowledge of what neurotoxins are, examples, mechanisms of action and effects. |

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| **Significant features or elements of module** |
| The module places emphasis on weekly laboratory practical sessions to help relate theory to practice and improve learners’ knowledge and skills for clinical practice. In addition, the use of online videos and simulation software are encouraged to reinforce the teaching of basic pharmacologic concepts. The simplicity of language used in the course design makes it easy for adaptation. Learners participate in collaborative work experiences that help them to develop strong foundations for team building through both face-to-face and online sessions. The module also touches on pharmacogenetics which covers potential grounds for drug design targeting specific populations with peculiar genetic dispensations. |

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| **Student profile in the context of this module:** | |
| What is the target group of students who would do this module? | Students in Level 200 in the following programmes of study;   1. Dentistry 2. General Nursing 3. Medicine 4. Midwifery 5. Pharmacy 6. Physician Assistantship 7. Public Health Nursing |
| What **skills** should a *student* have **already** mastered before starting this module? | 1. Good communication skills (written and oral) 2. Analytical thinking (able to make and justify decisions 3. Attention to detail 4. Basic skills and safety in laboratory procedures 5. Ability to conduct a literature search |
| What **prior knowledge** of the subject matter should a *student* have? | 1. Cell biology and function 2. Anatomy and physiology of the nervous system 3. Structure and function of proteins, lipids, carbohydrates and enzymes |

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| **Non-expert support:** | |
| What **skills** and **prior knowledge** of the subject matter  should *facilitators* have **already** mastered before starting to deliver this module? | The facilitator should have knowledge in pharmacodynamics, pharmacokinetics, pharmacogenomics and be able to relate these to appropriate clinical scenarios.  The facilitator should have:   1. Basic skills in laboratory procedures 2. Familiarity with pharmacology-related simulation software 3. Expertise at demonstrating and supervising students to perform laboratory experiments in pharmacology 4. Communication skills 5. Time management skills |
| What **skills** do *support staff* need in order to support the delivery of this module? | 1. Ability to prepare chemicals and drug solutions for practical sessions. 2. Provision of technical assistance to students. 3. Ability to plan ahead and manage resources in the laboratory. 4. Ability to maintain and calibrate technical equipment. 5. Time management and Communication skills. |

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| **Quality assurance matters** | | |
| How will feedback on module be obtained from students? | By asking students to give feedback through the following media:   * Using Padlet * Face-to-face feedback * Using the LMS * E-mails and WhatsApp messages * YouTube | |
| How will student feedback be used to improve module? | The application will depend on the nature of the feedback. | |
| A certificate, signed by the university’s Head of Quality Assurance, confirming that the module meets the requirements of the PEBL QA rubric is attached. | | Yes  No |

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Welcome and Introduction of the Pharmacology Module | | |
| Aim of the topic: | This unit aims at welcoming and introducing the learner to the module outline and topics to be treated this semester. We will also talk about some educational technologies that will support your learning along the way. The facilitators would introduce themselves, and the learner would also be given the opportunity to introduce him or herself.  You'll meet people who share your interests along the way, and they'll become part of your learning community. You'll discover how to apply key concepts and approaches to pave the way for a bright future in the field of pharmacological practice. | | |
| This topic covers: | Orientation of learners, introduction to the course, introduction to LMS and Padlet. | | |
| Intended learning outcomes: | *At the end of this* ***topic****, learners would be able to:*   1. negotiate the course outline (structure, learner activities and assessments) 2. outline your expectations of the course 3. navigate through the LMS and Padlet | | |

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| Overview of student activity: | A face-to-face orientation lecture would be held. The learner would watch a video tutorial on how to use Padlet and the University's learning management system. You will also participate in hands-on sessions in the computer lab, where a facilitator will assist you with demonstrations to further your understanding of these instructional platforms. The links for the UHAS LMS video and the Padlet video are as follows: <https://www.uhas.edu.gh/en/ulms.html>; <https://youtu.be/KmJY4j_F8Xc>. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. negotiate the course outline (structure, learner activities and assessments) and timetable | Not applicable | Face-to-face orientation lecture | Learners will navigate and provide feedback using the Padlet’s link: <https://padlet.com/aniadfafa/tvr8pkibw00mra8l> |
| 1. outline your expectations of the course | Not applicable | Face-to-face orientation lecture | Visit the UHAS LMS and write down five (5) expectations from your;   1. Course facilitator (s) 2. Classmates 3. Self |
| 1. navigate through the LMS and Padlet | Not applicable | Watching a Video, practical session in the computer Laboratory | Learners will navigate and provide feedback using the Padlet’s link: <https://padlet.com/aniadfafa/tvr8pkibw00mra8l> |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Not applicable | | | |
| Purpose of the unit/week/section: | | | |
| This session is to acquaint you with the scope of work ahead. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This unit welcomes and orients learners to the module in order to negotiate the course outline, which includes the structure, learner activities, assessments, and feedback. The facilitator would review learners’ relevant previous knowledge in Anatomy, Physiology and Biochemistry. Learners’ ability to conduct literature search would also be important as we go forward in the module. Learners would also be guided through the use of Padlet and the UHAS Learning Management System. Learners would also be divided into groups to encourage collaboration and teamwork. | | | |
| Pre-topic activity: | | Number of hours | 0 |
| Module registration | | | |
| Face to face time: *(if applicable)* | | Number of hours | 3 |
| Face-to-Face lecture  Computer Laboratory Session | | | |
| Online activity: | | Number of hours | 2 |
| What should students do? | * Watch a video on YouTube on how to use Padlet. <https://youtu.be/KmJY4j_F8Xc>. * Introduce yourself to your classmates and write out your experiences of the orientation and Padlet use. <https://padlet.com/aniadfafa/tvr8pkibw00mra8l> * Write out your expectations of the module | | |
| Where do they do it? | Out-of-class | | |
| By when should they do it? | By Thursday 5:00pm | | |
| E-moderator/tutor role | | | |
| Guiding learners through the course outline and the use of the relevant educational platforms | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 2 |
| * Monitor Padlet to evaluate students' technical app usage. * Evaluate students’ feedback on their experiences of the orientation and their expectations. * Monitor questions asked on the Padlet to assess students’ understanding. | | | |
| How does this section link to other sections of the module? | | | |
| This section introduces the module and prepares the learner for a new learning environment, establishes a clear path for the module’s outcome, and explains the etiquettes of blended learning. | | | |

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| = Total number of hours | 7 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * Module Outline * YouTube * Padlet * LMS |
| How are students enabled to access the resources? | The university ensures internet access for the students.  Links are provided to access YouTube and Padlet. |
| Where in this unit are students expected to work collaboratively? | Although this is an introductory unit and therefore has little opportunity for collaborative work at this stage, students will register on Padlet and introduce themselves to their classmates as a foundation for collaborative learning in the future. |
| How has an inclusive approach been incorporated in this unit? | * Initial face-to-face activities involve everyone. * Watching the video involves everyone. * Every student is encouraged to comment on the Padlet. |
| How will feedback on unit be obtained from students? | * Feedback through questions and answers during the face-to-face introductory lecture. * Use of Padlet and LMS. |
| How will student feedback be used to improve unit? | This is an orientation andthe feedback is likely to be used mainly to improve its organisation. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | This would be done during the next class.  General feedback would be given before the start of the following week’s lecture.  Students who may have difficulty in navigating through the Padlet and the UHAS LMS would be scheduled for assistance by the computer laboratory personnel. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Key Concepts in Pharmacology | | |
| Aim of the topic: | This unit introduces the learner to pharmacology, how it came into being and evolved as a scientific discipline and its link to other biomedical disciplines. | | |
| This topic covers: | * Definitions and divisions of pharmacology * Relation to other biomedical disciplines * Historical perspectives and pharmacology today * Drug definitions, sources, classifications, names * Drug reactions with examples | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Explain what pharmacology is about and its relationship to other biomedical disciplines. 2. Classify drugs and identify common drug reactions. | | |

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| Overview of student activity: | You will attend a face-to-face lecture. The assessment in this section involves further reading and discussion of the key concepts of Pharmacology in the groups you have created for yourselves. Lastly, there will be an introductory visit to the Pharmacology laboratory, where you will familiarise yourself with the basic equipment you will be using during practical sessions as well as the laboratory technologists. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Explain what pharmacology is about and its relationship to other biomedical disciplines. | 1 | * Face-to-face lectures * Your own personal reading on the topics | * Write a summary (in 300 words) of your understanding of Pharmacology and post on LMS (*this is a group assignment*). |
| 1. Classify drugs and identify common drug reactions. | 1 | * Face-to-face lectures * Your own personal reading on the topics | * Construct a table of 10 drug classes and their therapeutic effects. Also post this on LMS (*individual task*). |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Explain pharmacology and basic pharmacological principles that control actions of drugs in the body. | | | |
| Purpose of the unit/week/section: | | | |
| This unit explains what pharmacology is, how it developed as a scientific discipline, and how it relates to other biological to other disciplines. It lays the foundation that will scaffold your appreciation of the subsequent units. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This unit provides a historical context for situating the building blocks of Pharmacology. You will need to draw upon your communication skills and analytical thinking especially for your laboratory practical sessions ahead. | | | |
| Pre-topic activity: | | Number of hours | 1 |
| You will read about Key Concepts of Pharmacology.   * Search on google using the following key search terms: “Pharmacology, historical evolution of pharmacology, drug reaction” and read at least one article. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 5 |
| * Attend face-to-face Introductory lecture. * Visit to the pharmacology laboratory. | | | |
| Online activity: | | Number of hours | 1 |
| What should students do? | Working in your groups, you will write a summary (in 300 words) of your understanding of Pharmacology and post on LMS. | | |
| Where do they do it? | On UHAS LMS | | |
| By when should they do it? | By close of day Friday of the week | | |
| E-moderator/tutor role | | | |
| Lecture, asking and answering questions from students, directing students on online search activity and assess students’ work. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 2 |
| * Write a summary (in 300 words) of your understanding of Pharmacology and post on LMS. In this summary, we will be looking out of the definition of Pharmacology from a scientist and a clinician’s point of view. Additionally, we will look at the divisions of Pharmacology and their importance. The relationship with other biomedical disciplines should also feature. * Submit a table of drug classes and their therapeutic effects. | | | |
| How does this section link to other sections of the module? | | | |
| In this section, we look at key concepts upon which the subsequent topics are built. | | | |

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| = Total number of hours | 9 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * Basic Pharmacology Textbook [Rang & Dale's Pharmacology (2018)] * Google search using the following key search terms: “Pharmacology, historical evolution of pharmacology, drug reaction” * PowerPoint Lecture Slides |
| How are students enabled to access the resources? | * They are provided with relevant search terms to guide their google search. * Assistance from the library to obtain recommended textbook. |
| Where in this unit are students expected to work collaboratively? | The assessment task is to be done in groups. Members of each group will thus work together to ensure the task is completed and submitted. |
| How has an inclusive approach been incorporated in this unit? | Through learners working together in groups. |
| How will feedback on unit be obtained from students? | Feedback will be obtained through the assessment task submitted and answers to questions asked in class. |
| How will student feedback be used to improve unit? | This will depend on the type of feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | * Feedback will be given during question-and-answer sessions as part of the face-to-face lecture. * Specific feedback will be provided to the various groups on the LMS after the next lecture. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Targets of Drug Action | | |
| Aim of the topic: | The aim of this topic is to broaden learners’ knowledge on drug action principles and drug targets. | | |
| This topic covers: | * Enzymes * Ion channels * Carrier proteins * Receptors * Other targets | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Explain the targets of drug action 2. Describe the roles of targets in the mechanisms of drug action | | |

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| Overview of student activity: | * In this section, you will engage in a face-to-face lecture on drug action and a laboratory demonstration of conditions necessary for the maintenance of an isolated smooth muscle preparation. * Working in groups, learners would write a 300-word summary of their understanding of the topic and post it on LMS by 5:00 pm on Thursday. * A group will peer-review another group’s work to identify how well the major themes were discussed. * Post your comment on their work by 5:00 pm on Friday. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Explain the targets of drug action | 2 | Face-to-face lectures | You would answer a short quiz of 10 multiple choice questions that test your understanding of drug targets in the body (in-class). |
| 1. Describe the roles of targets in the mechanisms of drug action | 2 | Face-to-face lectures | Give feedback on the assessed peer review done on the UHAS LMS. |
| 1. Demonstrate the conditions necessary for the maintenance of an isolated smooth muscle preparation. |  | There would be a Laboratory demonstration on conditions necessary for the maintenance of an isolated smooth muscle preparation. | Report on the laboratory session. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| To Identify the major classes of drug receptors and targets of drug action within the body; pharmacological mechanisms by which drugs of various classes may alter biochemical, physiological or pathophysiological parameters to produce therapeutic or unwanted effects. | | | |
| Purpose of the unit/week/section: | | | |
| This session further reinforces your foundations for understanding drug action in the near future. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This unit builds upon your understanding of drug classification from the previous session and sets you off on the path to grasping the principles underlying the actions of drugs on the body and the body’s actions on drugs. | | | |
| Pre-topic activity: | | Number of hours | 1 |
| * Watch online videos demonstrating drug action using these links; <https://www.youtube.com/watch?v=9teP-jGfKPE> * <https://youtu.be/u49k72rUdyc> * <https://www.youtube.com/watch?v=aUHb61UdUH8> | | | |
| Face to face time: *(if applicable)* | | Number of hours | 5 |
| * Attend face-to-face lecture:  1. We will begin the class with discussion on the videos watched on drug targets. 2. The lecturer will summarise the unit’s topic with a PowerPoint presentation.  * There will be a Laboratory demonstration on conditions necessary for the maintenance of an isolated smooth muscle preparation. | | | |
| Online activity: | | Number of hours | 2 |
| What should students do? | * In groups, students would summarise their understanding of the topic in 300 words and post on the UHAS LMS. * Peer review one group’s assignment on the LMS. | | |
| Where do they do it? | On the UHAS LMS | | |
| By when should they do it? | By 5:00 pm Friday of the same week. | | |
| E-moderator/tutor role | | | |
| The tutor will guide the learning process through lectures and laboratory demonstrations. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 1 |
| * A short quiz of 10 questions would be used to test the understanding of drug targets in the body. After marking, the answers would be discussed in the class. * Learners working in groups will post summaries of the topic on LMS. There would be peer review of the posts made. Feedback from the peer review of the summaries posted on LMS will be assessed on how well they identified at least 3 drug classes and related their mechanisms of action to drug targets. * The criteria for assessing the laboratory reports are documented in the laboratory manual. | | | |
| How does this section link to other sections of the module? | | | |
| This section prepares the learner for lectures on receptor theory and drug action in the subsequent units. | | | |

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| = Total number of hours | 9 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * PowerPoint Lecture slides * Videos on YouTube * Rang & Dale's Pharmacology (2018) * Laboratory manual |
| How are students enabled to access the resources? | * They are provided with relevant search terms to guide their google search. * Assistance from library to obtain recommended textbook. |
| Where in this unit are students expected to work collaboratively? | The assessment will be completed in groups. As a result, members of each group would collaborate to ensure that the task is done and submitted. |
| How has an inclusive approach been incorporated in this unit? | Working together in groups. |
| How will feedback on unit be obtained from students? | * Feedback will be obtained through short quiz. * You will submit comments on peer review conducted on LMS. * You will submit a Laboratory report on the practical performed in the laboratory. |
| How will student feedback be used to improve unit? | This will depend on the type of feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | * Feedback will be given during question-and-answer sessions as part of the face-to-face lecture. * Specific feedback will be provided to the various groups on the LMS after the next lecture. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Receptor Theory | | |
| Aim of the topic: | This topic aims at enlightening learners on drug interaction in the body. | | |
| This topic covers: | * Occupancy theory * Drug-receptor interactions * Dose-response relationships and their interpretations * Agonists and antagonists | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Explain drug-receptor interactions 2. Describe dose-response relationships 3. Differentiate between agonists and antagonists | | |

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| Overview of student activity: | * Attend face-to-face Lectures. * Attend Laboratory demonstration on the dose-response curves using guinea-pig ileum. * Google search using the following key search terms: “Receptor types” for next week’s class. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Explain drug-receptor interactions. | 2 | Face-to-face lectures;  Laboratory demonstration | Take an online Quiz (10 questions) on drug receptors. |
| 1. Describe dose-response relationships. | 2 | Face-to-face lectures;  Laboratory demonstration | You will submit a report on the laboratory session on the dose-response curves using guinea-pig ileum. |
| 1. Differentiate between agonists and antagonists. | 2 | Face-to-face lectures;  Laboratory demonstration | You will submit a report on the laboratory session on the dose-response curves using guinea-pig ileum. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| To Identify the major classes of drug receptors and targets of drug action within the body; pharmacological mechanisms by which drugs of various classes may alter biochemical, physiological or pathophysiological parameters to produce therapeutic or unwanted effects. | | | |
| Purpose of the unit/week/section: | | | |
| This unit intends to broaden learners’ understanding of receptor theory and lays the foundation for drug design as well as elucidating potential mechanisms of drug action. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This section links up to the previous section in week 2 and focuses on drug-receptor interactions that underpin dose-response relationships and the actions of agonists and antagonists. | | | |
| Pre-topic activity: | | Number of hours | 1 |
| Read on the next unit topic (Receptor Theory)for next week’s class. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 5 |
| * Attend face-to-face lecture. * Attend Laboratory demonstration on the dose-response curves using guinea-pig ileum. | | | |
| Online activity: | | Number of hours | 1 |
| What should students do? | Take an online Quiz (10 questions) on drug receptors. | | |
| Where do they do it? | On the UHAS LMS | | |
| By when should they do it? | By Thursday 5:00pm of the same week | | |
| E-moderator/tutor role | | | |
| The tutor will guide the learning process through lectures and laboratory demonstrations. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 1 |
| * A short quiz of 10 questions would be used to test the understanding of drug targets in the body. After marking, the answers would be discussed in class. * There will be a laboratory demonstration *on* dose-response curves using guinea-pig ileum. The criteria for assessing the laboratory reports have been documented in the laboratory manual. | | | |
| How does this section link to other sections of the module? | | | |
| This section builds on the previous units on drug targets and forms the foundations for subsequent units relating to drug action. | | | |

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| = Total number of hours | 8 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * PowerPoint presentations * Google search * Laboratory manual |
| How are students enabled to access the resources? | * Learners are provided with laboratory manual. * Free internet access available |
| Where in this unit are students expected to work collaboratively? | During the laboratory session |
| How has an inclusive approach been incorporated in this unit? | Working in groups at the laboratory. |
| How will feedback on unit be obtained from students? | Learners will submit a report on the laboratory session on the dose-response curves using guinea-pig ileum in class and take an online quiz. |
| How will student feedback be used to improve unit? | This depends on the nature of their feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Feedback on the quiz will be given at the start of the next week’s lecture.  Feedback on the laboratory demonstration will be given before the next practical session. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Receptor Superfamilies with Examples | | |
| Aim of the topic: | This topic aims at explaining the concepts of receptor superfamilies, receptor regulation and the mechanism of drug action. | | |
| This topic covers: | * Signal transduction and its characteristics * Ligand-gated ion channels * G Protein-coupled receptors * Tyrosine kinase receptors * Nuclear receptors * Receptor Regulation | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Describe receptor types 2. Explain the relationship between receptor regulation and the mechanism of drug action. | | |

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| Overview of student activity: | You will watch online videos on the nature and types of drug receptors. Following this, there would be a face-to-face lecture to help strengthen your understanding of the topic. Also, you would participate in a computer-based simulation on dose-response curves and the site of drug action using isolated guinea pig ileum. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Describe receptor types | 2 | Face-to-face lectures;  Laboratory demonstration | You would summarise your understanding of receptor types and post on LMS |
| 1. Explain the relationship between receptor regulation and the mechanism of drug action | 2 | Face-to-face lectures;  Laboratory demonstration | You will submit a report on the simulation conducted in your lab report book. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| To Identify the major classes of drug receptors and targets of drug action within the body; pharmacological mechanisms by which drugs of various classes may alter biochemical, physiological or pathophysiological parameters to produce therapeutic or unwanted effects. | | | |
| Purpose of the unit/week/section: | | | |
| Learners would be able to recognise and describe the different types of receptors, as well as explain the relationship between receptor regulation and drug action mechanisms. Similar to the activities in Week 3, this section is also relevant to drug design. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This section is approached with a thorough revision of the contents in weeks 2 and 3. It serves as a springboard for you to dive into more focused elements of what drugs do to the body (pharmacodynamics) and what the body does to drugs (pharmacokinetics). | | | |
| Pre-topic activity: | | Number of hours | 1 |
| Read on receptor superfamilies with examples | | | |
| Face to face time: *(if applicable)* | | Number of hours | 5 |
| Attend face-to-face Lecture  Simulation on dose-response curves and site of drug action using guinea pig isolated ileum. | | | |
| Online activity: | | Number of hours | 1 |
| What should students do? | * Watch online videos on the receptor types (https://youtu.be/WORIhbaRABg , https://youtu.be/i7\_VTkhR3UI) | | |
| Where do they do it? | On YouTube | | |
| By when should they do it? | By Friday 5:00pm of the same week | | |
| E-moderator/tutor role | | | |
| The tutor will guide the learning process through lectures and laboratory demonstrations. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 2 |
| * Learners will post a 300-word summary of receptor types on LMS. The summary will assess knowledge of ligand-gated ion channels, G Protein-coupled receptors, tyrosine kinase receptors, and nuclear receptors with 3 examples each. * There will also be simulation on dose-response curves and site of drug action using guinea pig isolated ileum. The criteria for assessing the simulation reports are documented in the laboratory manual. | | | |
| How does this section link to other sections of the module? | | | |
| This section builds on the previous units and will help learners understand the effects of drugs on living organisms in the subsequent units. | | | |

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| = Total number of hours | 9 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * PowerPoint presentations * YouTube videos * Laboratory manual |
| How are students enabled to access the resources? | * Learners would be provided with a laboratory manual. * Free internet access is available. |
| Where in this unit are students expected to work collaboratively? | Working in groups during the simulation and in doing assignments. |
| How has an inclusive approach been incorporated in this unit? | Working in groups during the simulation and in doing assignments. |
| How will feedback on unit be obtained from students? | * You will write a 300-word summary of your understanding of receptor types in groups and post it on LMS. * You will submit a report on the simulation conducted in your lab report book. |
| How will student feedback be used to improve unit? | This depends on the nature of their feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | * Feedback on the laboratory report will be given before the next practical session. * Feedback on the group assignments will be given a day after the next week’s lecture. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Pharmacokinetics (PK) | | |
| Aim of the topic: | This topic intends to teach learners about the pathway of a drug from absorption to elimination as well as the presence of any genetic polymorphism that affects pharmacokinetics or pharmacodynamics of currently prescribed medications. | | |
| This topic covers: | * Drug absorption and bioavailability * Drug distribution * Drug metabolism: Phases I & II reactions: Enzyme induction/inhibition * Drug excretion/elimination | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Describe drug absorption and distribution and discuss the factors that affect them in the body. 2. Explain biotransformation and elimination of drugs, as well as their implications for drug safety. | | |

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| Overview of student activity: | There will be an online lecture focusing on absorption, distribution and bioavailability following drug administration. Also, working in groups, you will prepare a 10-slide PowerPoint presentation on drug metabolism and elimination. You will also do an online search and read on why people react differently to drugs in preparation for the following week’s activities. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Describe drug absorption and distribution and discuss the factors that affect them in the body. | 1 | Online lectures | Mid-semester examination |
| 1. Explain biotransformation and elimination of drugs, as well as their implications for drug safety. | 1 | Preparation of your own PowerPoint presentation on drug metabolism and elimination | Mid-semester examination |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Explainbasic pharmacological principles that control actions of drugs in the body. | | | |
| Purpose of the unit/week/section: | | | |
| In this unit, the learner will engage with drug absorption, distribution, metabolism and elimination pathways and the factors that influence these processes. This section is important to appreciate variations in drug dosage regimen between adults and children, for instance or between healthy individuals and those with conditions such as renal or hepatic dysfunction. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| In this section, you will draw on your previous knowledge of the role of enzymes in metabolism among others from Biochemistry to situate this section’s content on drug absorption and bioavailability. It also provides an avenue to better appreciate doses and response effect which was mentioned the previous week. This section is more or less the umbrella topic for what would be treated the following week. | | | |
| Pre-topic activity: | | Number of hours | 1 |
| * In groups, students would go online and study about the fundamentals of pharmacokinetics (PK). In their search, they would use terms like 'drug adsorption,' 'drug distribution,' and 'pharmacokinetics.' | | | |
| Face to face time: *(if applicable)* | | Number of hours | 0 |
| Not applicable | | | |
| Online activity: | | Number of hours | 4 |
| What should students do? | * Attend online lecture (Zoom). Link would be provided * Participants in this E-tivity will construct a voice-recorded PowerPoint presentation (10 slides maximum) on drug metabolism and elimination, and upload it to the LMS by 5:00 pm on the following day. | | |
| Where do they do it? | On Zoom and UHAS LMS | | |
| By when should they do it? | By 5 pm Tuesday | | |
| E-moderator/tutor role | | | |
| The tutor will guide the learning process via zoom and organise Mid-semester examination for learners. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 1 |
| * After marking the interim assessment covering units 1-5, we would have a class discussion of salient points arising from the examination. * Marks would be allocated for the PowerPoint presentations students will do on drug metabolism and elimination based on content, structure and communication skills. | | | |
| How does this section link to other sections of the module? | | | |
| This section of the module helps the learner to better understand pharmacogenomics and how the body affects the actions of drugs in the subsequent units. | | | |

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| = Total number of hours | 6 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * PowerPoint presentation * Google search |
| How are students enabled to access the resources? | * Free internet access is available. * Provide recorded zoom lectures. |
| Where in this unit are students expected to work collaboratively? | Learners work together on a group presentation. |
| How has an inclusive approach been incorporated in this unit? | Working on group assignments for a zoom presentation. |
| How will feedback on unit be obtained from students? | Learners will write a Mid-Semester examination. |
| How will student feedback be used to improve unit? | This will depend on the nature of the feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Feedback would be given two (2) weeks after writing the mid-semester examination. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Pharmacogenomics and pharmacogenetic polymorphisms | | |
| Aim of the topic: | In the previous week, we learnt about drug metabolism and excretion and the various roles enzymes play in these processes. In this unit, we would be looking at the genetic underpins for individual variations in drug response and the relevance for drug design, dosage regimen and side effects in specific populations with particular genetic mutations. | | |
| This topic covers: | * Elementary genetics * Single gene pharmacokinetic disorders * Therapeutic drugs and available pharmacogenomic tests | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Explain pharmacogenetics and pharmacogenomics and their clinical relevance with selected examples. 2. Discuss the pharmacogenomic tests which are currently clinically available. | | |

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| Overview of student activity: | There would be a face-to-face lecture where the facilitator will discuss both terms and their implications on drug design and individualised drug therapy. The facilitator will provide corrective feedback in response to questions asked in the class. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Explain pharmacogenetics and pharmacogenomics, and their clinical relevance with selected examples. | 3 | * Online lectures (Zoom Link will be provided). * You are urged to read further on the topic. Some resources have been provided. | Working in your various groups, post a 500-word overview of the potential role of pharmacogenetics in cancer treatment on the LMS by 5 pm on Wednesday. |
| 1. Discuss the pharmacogenomic tests which are currently clinically available. | 3 | * Online lecture (Zoom Link will be provided) * You are urged to read further on the topic.   Some resources have been provided | Write a short quiz (15 MCQs) on key concepts in pharmacogenetics and pharmacogenomics and their implications on drug design in clinical care (individual activity in-class) |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| ***Explain*** pharmacogenomics and pharmacogenetics and the leading position they will occupy in the near future. | | | |
| Purpose of the unit/week/section: | | | |
| This unit discusses individual variations in drug response, the potential genetic basis for it and insights into the new field of personalised or individualised medicine | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This section is a sub-topic of pharmacokinetics from last week and provides insights into new treatment options for specialised populations. It also explains why different people may react differently to drugs or may have different extents of drug adverse effects. | | | |
| Pre-topic activity: | | Number of hours | 1 |
| Search online and read on why people react differently to drugs than others. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 0 |
| Not applicable | | | |
| Online activity: | | Number of hours | 3 |
| What should students do? | * Online zoom lecture. * In groups, submit an overview of the implication of pharmacogenetics for cancer treatment. | | |
| Where do they do it? | Zoom and LMS | | |
| By when should they do it? | Lecture- Monday 8:00 am-10:00 am  Submission of assignment -Thursday 5:00 pm | | |
| E-moderator/tutor role | | | |
| * To guide learning * Assess learners’ understanding using an assignment as well as feedback * To provide learning resources to learners | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 1 |
| * Learners would submit a 500-word overview of the potential role of pharmacogenetics in cancer treatment and this should feature the roles of recent clinically-relevant pharmacogenetic testing and gene therapy. * After marking a short quiz on key concepts in pharmacogenetics and pharmacogenomics and their implications for drug development, salient points arising would be discussed. | | | |
| How does this section link to other sections of the module? | | | |
| The previous section, pharmacokinetics, considered drug metabolism and excretion, factors affecting these processes and their overall clinical relevance. This section is more or less a continuation and relates to the genetic underpins of variations in drug response in individuals/specialised populations with defined gene mutations. | | | |

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| = Total number of hours | 5 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | “Individual Variation, Pharmacogenomics and Personalised Medicine” in Rang and Dale’s Pharmacology (2018). |
| How are students enabled to access the resources? | The learners would be able to access these resources through the E-library and also consult the librarians in locating books (both e-books and hard copies). |
| Where in this unit are students expected to work collaboratively? | Learners would be working in groups to come up with an overview of the role of pharmacogenetics in cancer treatment. |
| How has an inclusive approach been incorporated in this unit? | By attending online zoom lectures and working in groups to facilitates inclusivity. |
| How will feedback on unit be obtained from students? | Feedback would be obtained from the group assignments and the short quiz as well as facilitator-learner class interaction. |
| How will student feedback be used to improve unit? | This will depend on the nature of the feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | General feedback would be given on the Monday before the start of the following week’s lecture, and specific feedback will be given after the week’s lecture. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Overview of Autonomic Nervous System (ANS) | | |
| Aim of the topic: | This topic aims at introducing you to the anatomy and functions of the autonomic nervous system. | | |
| This topic covers: | * Anatomical projections of the sympathetic and parasympathetic divisions of the ANS * Homeostasis with regard to the ANS * Responses of end organs to activation of each division of the ANS | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Describe the anatomy of the ANS 2. Explain the functions of the sympathetic and parasympathetic nervous system 3. Describethe role of ANS in homeostasis. | | |

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| Overview of student activity: | * Asynchronous online lecture on LMS (PowerPoint presentation with voice notes on the anatomy and functions of the ANS). You are encouraged to go over these lecture slides at least twice before class on Wednesday * Face-to-face interaction on Wednesday after the lecture to address feedback/questions arising from the asynchronous online engagement. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Describe the anatomy of the ANS. | 4 | Online lecture and face-to-face session to address feedback | Group presentations in class (7-10 minutes each) of a mind-map linking the two divisions of the ANS to end-organ response and homeostasis (In class). |
| 1. Explain the functions of the sympathetic and parasympathetic nervous system. | 4 | Online lecture and face-to-face session to address feedback | Group presentations in class (7-10 minutes each) of a mind-map linking the two divisions of the ANS to end-organ response and homeostasis (In class). |
| 1. Describe the role of ANS in homeostasis. | 4 | Online lecture and face-to-face session to address feedback | Group presentations in class (7-10 minutes each) of a mind-map linking the two divisions of the ANS to end-organ response and homeostasis (In class). |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Explain the biosynthesis, physiological actions of catecholamines and acetylcholine (ACh) and drugs that affect adrenergic and cholinergic transmission. | | | |
| Purpose of the unit/week/section: | | | |
| This unit gives you a foundation to understand the actions of autonomic drugs. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| Here, you will need to borrow from your previous knowledge of the anatomy and physiology of the autonomic nervous system. This unit set the foundation for understanding the actions of cholinergic drugs and catecholamines. | | | |
| Pre-topic activity: | | Number of hours | 1 |
| Revise your lecture notes on anatomy and physiology of the autonomic nervous system. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 2 |
| Face-to-face interaction on the Wednesday after the lecture to address feedback/questions arising from the asynchronous online engagement. | | | |
| Online activity: | | Number of hours | 2 |
| What should students do? | The student would participate in an online lecture (voice-recorded). | | |
| Where do they do it? | On the LMS | | |
| By when should they do it? | Before the face-to-face time on the Wednesday | | |
| E-moderator/tutor role | | | |
| The tutor will guide the learning process through lectures. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 1 |
| There would be a presentation to assess the knowledge of learners on the two divisions of the ANS, end-organ response to the stimulation of the ANS and its role in homeostasis. | | | |
| How does this section link to other sections of the module? | | | |
| This section helps you to better understand the units on Cholinergic and Adrenergic agonists and antagonists. | | | |

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| = Total number of hours | 6 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | PowerPoint presentation |
| How are students enabled to access the resources? | * Free internet available * LMS |
| Where in this unit are students expected to work collaboratively? | Group presentations. |
| How has an inclusive approach been incorporated in this unit? | Working in groups both at lecture and in doing group assignments. |
| How will feedback on unit be obtained from students? | Through group presentation of assignment. |
| How will student feedback be used to improve unit? | This will depend on the nature of the feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | General feedback will be given on Monday before the start of the following week’s lecture and specific feedback will be given after the week’s lecture. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Cholinergic Agonists and Antagonists | | |
| Aim of the topic: | This topic introduces the learner to Cholinergic Agonists and Antagonists and their therapeutic uses. | | |
| This topic covers: | * Steps in the synthesis of ACh * Cholinergic receptors * Cholinergic agonists and antagonists | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Describe steps involved in the synthesis and drug interference regarding acetylcholine 2. Differentiate cholinergic agonists and antagonists 3. Discuss the therapeutic uses of cholinergic agonists and antagonists | | |

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| Overview of student activity: | The learner would participate in an online lecture, watch videos and laboratory practical sessions relating to the Biosynthesis of Ach and the actions of cholinergic receptors, agonists and antagonists. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Describe steps involved in the synthesis and drug interference regarding acetylcholine | 4 | Online lecture,  YouTube videos | Learners would have a test made up of 10 short-answer questions on the synthesis, mechanism of action and clinical/physiological manifestations of cholinergic agonists and antagonists. |
| 1. Differentiate cholinergic agonists and antagonists. | 4 | Online lecture,  YouTube videos, Laboratory demonstration | * Learners would have a test made up of 10 short-answer questions on the synthesis, mechanism of action and clinical/physiological manifestations of cholinergic agonists and antagonists. * You will submit a report on the laboratory session. |
| 1. Discuss the therapeutic uses of cholinergic agonists and antagonists. | 4 | Online lecture,  YouTube videos | Learners would have a test made up of 10 short-answer questions on the synthesis, mechanism of action and clinical/physiological manifestations of cholinergic agonists and antagonists. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Explain the biosynthesis, physiological actions of catecholamines and acetylcholine (ACh) and drugs that affect adrenergic and cholinergic transmission. | | | |
| Purpose of the unit/week/section: | | | |
| The unit covers cholinergic agonists and antagonists, their mechanisms of action and therapeutic uses as well as an overview of nicotinic and muscarinic receptors. This unit will enable you to recognise the clinical effects of cholinergic agonists and antagonists. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This section builds on the contents of week 7 to explain the mechanisms of action of cholinergic agonists and antagonists and the role anticholinesterases play. | | | |
| Pre-topic activity: | | Number of hours | 1 |
| You will watch two (2) videos on YouTube on the steps in the synthesis of acetylcholine and the mechanisms of action of cholinergic agonists/antagonists. | | | |
| Face to face time: *(if applicable)* | | Number of hours | 3 |
| You will attend a laboratory session. | | | |
| Online activity: | | Number of hours | 2 |
| What should students do? | Online zoom lecture | | |
| Where do they do it? | Zoom | | |
| By when should they do it? | on Monday 08:00am-10:00am | | |
| E-moderator/tutor role | | | |
| The tutor will guide the learning process through online lectures and laboratory demonstrations. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 2 |
| After marking the short quiz on cholinergic agonists and antagonists, we will discuss salient points arising from the examination to reinforce learning.  The laboratory report on the demonstration of the effect of muscarinic drugs and cholinesterase activity on guinea pig ileum will be assessed based on the criteria set in the appropriate section of the laboratory manual. | | | |
| How does this section link to other sections of the module? | | | |
| This section expands on the pharmacology of the Autonomic Nervous System. | | | |

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| = Total number of hours | 8 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * Online zoom Lecture * YouTube * Laboratory manual |
| How are students enabled to access the resources? | * Free internet access available for the students. * YouTube links provided. |
| Where in this unit are students expected to work collaboratively? | Working in groups at the laboratory and submitting a report. |
| How has an inclusive approach been incorporated in this unit? | Working in groups at the laboratory and submitting a report. |
| How will feedback on unit be obtained from students? | * Feedback during the lecture. * There is a quiz and a laboratory report submission. |
| How will student feedback be used to improve unit? | This depends on the nature of the feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | This would be done during the next class. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Skeletal Neuromuscular Function | | |
| Aim of the topic: | This topic helps you to appreciate the pharmacologic action of neuromuscular blocking drugs. | | |
| This topic covers: | * Transmission at the neuromuscular junction * Myasthenia gravis * Anticholinesterase drug action * Non-depolarising and depolarising blocking agents | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Describe transmission at the neuromuscular junction. 2. Discuss the pharmacology of depolarising and non-depolarising neuro-muscular blocking agents. | | |

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| Overview of student activity: | There would be an online lecture on transmission at the neuromuscular junction and the action of blocking agents. Also, learners would submit an assignment on the physiology of skeletal muscle contraction. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Describe transmission at the neuromuscular junction | 4 | Online lecture | Learners would individually submit on the LMS an outline of the processes leading from an action potential in a motor nerve to contraction in a muscle. |
| 1. Discuss the pharmacology of depolarising and non-depolarising neuro-muscular blocking agents | 4 | Online lecture | You will individually submit on the LMS an outline of the processes leading from an action potential in a motor nerve to contraction in a muscle. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Explain the biosynthesis, physiological actions of catecholamines and acetylcholine (ACh) and drugs that affect adrenergic and cholinergic transmission. | | | |
| Purpose of the unit/week/section: | | | |
| This section will help you understand the pharmacology of neuromuscular blocking drugs and their use in anaesthesia. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This section draws on the physiology of nerve transmission at the neuromuscular junction to further explain the use of anticholinesterases and other drugs such as non-depolarising and depolarising agents. | | | |
| Pre-topic activity: | | Number of hours | 2 |
| You will read on the transmission at the neuromuscular junction in preparation for the next lecture | | | |
| Face to face time: *(if applicable)* | | Number of hours | 0 |
| Not applicable | | | |
| Online activity: | | Number of hours | 4 |
| What should students do? | * Attend online zoom lecture * You will individually submit an outline of the processes leading from an action potential in a motor nerve to contraction in a muscle | | |
| Where do they do it? | Zoom and LMS | | |
| By when should they do it? | * Online Lecture on Monday 08:00 am-10:00 am * Submission of assignment online by Thursdays 5:00 pm | | |
| E-moderator/tutor role | | | |
| The tutor will guide learning via online zoom lecture | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 1 |
| Learners will submit an outline of the processes leading from an action potential in a motor nerve to contraction in a muscle. The outline will assess knowledge of relevant elements including storage and release of ACh, binding of ACh to its receptors and action of calcium on muscle contraction. | | | |
| How does this section link to other sections of the module? | | | |
| This section builds on the previous unit on cholinergic agonists and antagonists. | | | |

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| = Total number of hours | 7 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | Goodman & Gilman's: The Pharmacological Basis of Therapeutics. 13th Edition. McGraw Hill Medical, 2018 |
| How are students enabled to access the resources? | * The learners can access these resources through the E-library and also consult the librarians in locating books (both e-books and hard copies). * LMS |
| Where in this unit are students expected to work collaboratively? | Attend online lecture. |
| How has an inclusive approach been incorporated in this unit? | Participate in an online lecture. |
| How will feedback on unit be obtained from students? | Feedback will be obtained through the submission of assignment on LMS. |
| How will student feedback be used to improve unit? | This depends on the nature of the feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | General feedback will be given on the Monday before the start of the following week’s lecture and specific feedback will be given after the week’s lecture. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Adrenergic Agonists and Antagonists | | |
| Aim of the topic: | This topic introduces you to the biosynthesis and pharmacological actions of catecholamines. | | |
| This topic covers: | * Steps in the synthesis, storage, release and inactivation of norepinephrine and epinephrine * Types and subtypes of adrenergic receptors and their locations * Pharmacological actions of adrenergic agonists and antagonists * Therapeutic uses of adrenergic agonists and antagonists | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Describe the biosynthesis of catecholamines and their target receptors 2. Demonstrate Pharmacological actions of adrenergic agonists and antagonists 3. Explain therapeutic uses of adrenergic agonists and antagonists | | |

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| Overview of student activity: | You will attend zoom lectures on the biosynthesis of catecholamines, their target receptors and therapeutic uses. There will also be a laboratory demonstration of the effect of autonomic drugs. Finally, you will write an Interim Assessment on topics spanning weeks 6 to 10. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Describe the biosynthesis of catecholamines and their target receptors. | 4 | Zoom lecture | An interim assessment covering topics treated from weeks 6-10 |
| 1. Demonstrate Pharmacological actions of adrenergic agonists and antagonists. | 4 | Zoom lecture and laboratory session | You would submit a report on the laboratory demonstration of autonomic drugs on the anaesthetised cat |
| 1. Explain therapeutic uses of adrenergic agonists and antagonists. | 4 | Zoom lecture | An interim assessment covering topics treated from weeks 6-10 |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Explain the biosynthesis, physiological actions of catecholamines and acetylcholine (ACh) and drugs that affect adrenergic and cholinergic transmission | | | |
| Purpose of the unit/week/section: | | | |
| This unit will help you to better understand cardiovascular pharmacology in the latter years. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This section focuses on the actions of catecholamines and implications for therapeutics. | | | |
| Pre-topic activity: | | Number of hours | 1 |
| Watch a video on Adrenergic Agonists and Antagonistsin preparation for next week’s lecture using the following link: <https://www.youtube.com/watch?v=FCOJq_G-1TE> | | | |
| Face to face time: *(if applicable)* | | Number of hours | 3 |
| You will attend a laboratory session | | | |
| Online activity: | | Number of hours | 2 |
| What should students do? | * You will attend an online zoom lecture. * You will submit a laboratory report on the laboratory demonstration of autonomic drugs on the anaesthetised cat | | |
| Where do they do it? | Zoom and LMS | | |
| By when should they do it? | Thursday 5:00 pm | | |
| E-moderator/tutor role | | | |
| The tutor will guide the learning process during zoom lecture and laboratory session | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 2 |
| * A quiz covering topics treated from weeks 6-10 would be conducted and answers will be reviewed in class after marking. * There will be a laboratory demonstration of autonomic drugs on the anaesthetised cat and a report will be submitted. The criteria for assessing the laboratory report are documented in the laboratory manual. | | | |
| How does this section link to other sections of the module? | | | |
| This section links to the previous week’s lecture on cholinergic drug action and the larger autonomic nervous system physiology and function. | | | |

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| = Total number of hours | 8 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | * YouTube * LMS * Laboratory manual |
| How are students enabled to access the resources? | Free internet access available. |
| Where in this unit are students expected to work collaboratively? | Working together in groups at the laboratory and online zoom lectures. |
| How has an inclusive approach been incorporated in this unit? | Participate in group report submission. |
| How will feedback on unit be obtained from students? | Feedback will be obtained through an interim assessment on topics from week 6-10 and a lab report. |
| How will student feedback be used to improve unit? | This will depend on the nature of the feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | General feedback will be given on the Monday before the start of the following week’s lecture and specific feedback will be given after the week’s lecture. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Non-Adrenergic, Non-Cholinergic (NANC) transmission | | |
| Aim of the topic: | This topic will introduce you to nitric oxide as a neurotransmitter | | |
| This topic covers: | * Purinergic transmission * Endothelium-derived relaxing factor * Nitric oxide as a neurotransmitter | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Discuss the pharmacology of non-adrenergic/non-cholinergic transmitters | | |

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| Overview of student activity: | In this section, we will have group PowerPoint presentations on the synthesis and action of nitric oxide and the drugs that influence its effect in the body. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Discuss the pharmacology of non-adrenergic/non-cholinergic transmitters | 5 | Working in your groups, make PowerPoint presentations on the biosynthesis and actions of Nitric Oxide and drugs influencing its effects in the body | The PowerPoint presentations will be assessed and awarded marks using a rubric. |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Explainthe biosynthesis and physiological actions of non‐adrenergic, non‐cholinergic (NANC) transmitters. | | | |
| Purpose of the unit/week/section: | | | |
| This unit serves to draw attention that other neurotransmitters outside the cholinergic and adrenergic variety exist and play significant roles in human physiology. | | | |
| Over to you: *(a description of the process of the section)* | | | |
| Weeks 7-10 have involved the biochemical basis of transmission in the autonomic nervous system. In this unit, we will consider non-cholinergic and non-adrenergic transmitters; the most important of which is Nitric Oxide. We will look at the synthesis and actions of Nitric Oxide and drugs that influence if effects on the body. | | | |
| Pre-topic activity: | | Number of hours | 3 |
| Preparation of your group PowerPoint presentation | | | |
| Face to face time: *(if applicable)* | | Number of hours | 2 |
| Group presentation | | | |
| Online activity: | | Number of hours | 0 |
| What should students do? | none | | |
| Where do they do it? | none | | |
| By when should they do it? | none | | |
| E-moderator/tutor role | | | |
| The tutor will steer the group presentations and ensure inclusivity. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 2 |
| Students will do PowerPoint presentations on the biosynthesis and actions of Nitric Oxide and drugs influencing its effects in the body. Marks will be allocated for the PowerPoint presentations based on content, structure and communication skills. | | | |
| How does this section link to other sections of the module? | | | |
| This section looks at other transmitters in the ANS which are non-adrenergic and non-cholinergic. | | | |

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| = Total number of hours | 7 |

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| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | PowerPoint Presentation |
| How are students enabled to access the resources? | * Free internet access available. * The learners can access these resources through the E-library and also consult the librarians in locating books (both e-books and hard copies). |
| Where in this unit are students expected to work collaboratively? | Working together for PowerPoint presentation. |
| How has an inclusive approach been incorporated in this unit? | Participating in group work. |
| How will feedback on unit be obtained from students? | PowerPoint presentations will be assessed and awarded marks using a rubric. |
| How will student feedback be used to improve unit? | This will depend on the nature of the feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Feedback would be given at the end of the day’s session. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*

UNIT/WEEK/SECTION-LEVEL TEMPLATE

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| **Unit-level overview** | | **Unit/week/section** |  |
| Topic name: | Local Anaesthetics | | |
| Aim of the topic: | This session introduces you to the pharmacological actions and clinical uses of local anaesthetic agents. | | |
| This topic covers: | * Mechanisms of action of local anaesthetic agents * Properties of local anaesthetic agents * Methods of administration, uses and adverse effects of local anaesthetic agents | | |
| Intended learning outcomes: | *At the end of this* ***topic****, you will be able to:*   1. Describethe pharmacological actions of local anaesthetic agents | | |

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| Overview of student activity: | You would watch online lecture videos on the action of local anaesthetic agents, following which we will have a class discussion on the lecture content. |

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| **Constructive alignment of unit level outcomes with module level outcomes, learning activities and assessment** *(Pressing <Tab> at the end of the table will provide additional rows in the table, if required.)* | | | |
| Intended unit learning outcomes: | No of module-level outcome | Activity where students engage with this outcome | Where and how is this outcome assessed? |
| ***At the end of this unit, you will be able to:*** | | | |
| 1. Describe the pharmacological actions of local anaesthetic agents | 6 | Watching online video  Class discussion led by the facilitator | On the LMS, post five (5) key points on the pharmacological actions of local anaesthetic agents from the videos watched by Wednesday 5:00 pm |
| 1. Explain the actions of neurotoxins | 6 | Reading on neurotoxins | Write a 400-word overview on the actions of neurotoxins and post it on the LMS by Friday 5:00 pm |

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| Detailed explanation of ALL student and teacher engagement with the unit:  ***(This should be presented in the order that the activities take place. So if students do work* online *before* *coming to the lecture, that should be shown ahead of what happens in class.***  ***If there is more than one opportunity for face-to-face contact, or more than one online task, there should be a separate section for each instance, and they should be presented in the template in the same order that students encounter them.)***  ***Content*** *– such as lecture material – can EITHER be shown here OR added as* ***clearly identifiable*** *addenda to the document. If you plan to use addenda, you should ensure that these are cross-referenced in this section.)* | | | |
| Module-level outcomes addressed: | | | |
| Describe the pharmacology of local anaesthetic agents. | | | |
| Purpose of the unit/week/section: | | | |
| This unit will help you understand the clinical use of local anaesthetic agents and the effects of neurotoxins, for instance tetrodotoxin | | | |
| Over to you: *(a description of the process of the section)* | | | |
| This section draws from the use of neuromuscular blocking agents but here we emphasise sensory nerves rather than motor nerves. The section explains the mechanisms of action, properties and adverse effects of local anaesthetic agents. | | | |
| Pre-topic activity: | | Number of hours | 0 |
| None | | | |
| Face to face time: *(if applicable)* | | Number of hours | 2 |
| Class discussion will be led by facilitator. | | | |
| Online activity: | | Number of hours | 3 |
| What should students do? | Read on neurotoxins  Watch lecture videos | | |
| Where do they do it? | LMS and YouTube | | |
| By when should they do it? | * Video lecture on Monday 8:00 am to 10:00 am * Submission on LMS by Friday 5:00 pm | | |
| E-moderator/tutor role | | | |
| The tutor will moderate the class discussion after watching the video. | | | |
| How are the learning outcomes in this unit assessed? | | Number of hours | 1 |
| * Learners will watch videos on local anaesthetic agents and post 5 key points they have learnt regarding their mechanisms of action, properties, methods of administration and adverse effects. * Learners will submit a 400-word overview of the actions of neurotoxins. This is to will assess knowledge of what neurotoxins are, examples, mechanisms of action and effects. | | | |
| How does this section link to other sections of the module? | | | |
| This section links to the earlier unit on drug targets and pharmacokinetics. | | | |

|  |  |
| --- | --- |
| = Total number of hours | 6 |

|  |  |
| --- | --- |
| **Some important questions** | |
| Which learning resources/ references will scaffold the students’ learning? | YouTube |
| How are students enabled to access the resources? | Free internet access is available. |
| Where in this unit are students expected to work collaboratively? | Working in groups as a class during discussions. |
| How has an inclusive approach been incorporated in this unit? | Participate in group discussions. |
| How will feedback on unit be obtained from students? | Feedback will be obtained through the group assignment posted on LMS. |
| How will student feedback be used to improve unit? | This will depend on the nature of the feedback. |
| At which point(s) will students receive formative feedback on the work they have done in the unit? | Feedback will be obtained at the end of the day’s class session. |

END OF UNIT/WEEK/SECTION-LEVEL TEMPLATE

*You should copy sufficient unit templates so that there is one for each unit of your module in the space below.*