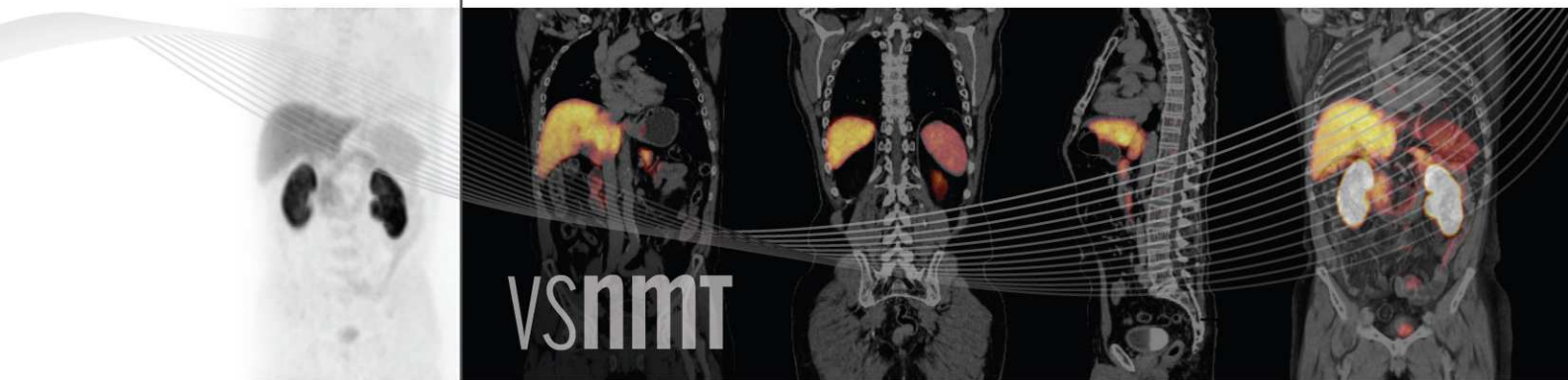


# Diagnostic CT for Molecular Imaging

## Course Information Booklet

For course commencing February 2012



*Prepared by:*

The Victorian Society of Nuclear Medicine Technologists (VSNMT) Inc

*Acknowledgements:*

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# Diagnostic CT for Molecular Imaging

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## 1. INTRODUCTION

The aim of the Diagnostic CT for Molecular Imaging course is to provide Nuclear Medicine Technologists in Victoria with a structured course of study in computed tomography (CT).

The content of this course has been bench-marked against the computed tomography specialist units offered in the Master of Radiographic Practice, Monash University (2008), with recognition of prior learning granted to graduates of the Bachelor of Applied Science (Medical Radiations), RMIT University who commenced their course in or after 1992. Graduates who commenced their course pre-1992 can undertake the course after successfully completing an online CT entry assessment.

The resulting course comprises three Modules of Study covering the Physics of CT Imaging and Dosimetry, CT Clinical Methods and CT Clinical Applications. Modules 1 and 2 cover topics you will study using online learning materials (lecture/study notes). Module 3 is three weeks of supervised CT clinical practice. To receive a Statement of Completion, you must satisfactorily complete all assessment requirements within sixteen weeks of the commencement date of the course.

The course will commence on Monday 27 February 2012 and candidates have until Friday 15 June 2012 to complete Modules 1, 2 and 3 (16 weeks). Graduates of the Bachelor of Applied Science (Nuclear Medicine) offered by RMIT University, who have completed the course since the introduction of CT into the undergraduate program, i.e. those graduates who commenced this course in or after 1992, are eligible to apply to do the CT course. The VSNMT will also permit qualified Nuclear Medicine Technologists who have successfully completed an online assessment of prior learning to enter the course.

The number of candidates admitted into this course will be restricted to a maximum of 25. Candidates will be accepted into the course based on the order of receipt of fully completed application

documentation (without payment). Applications open at 9.00am on Monday 12 December 2011 and close at 4.00pm on Friday 23 December 2011.

*Note that this is a demanding course. Before applying, applicants should ensure that they can allocate sufficient time to complete the online learning Modules and undertake the clinical placement during the 16 weeks of the course.*

If you are interested in enrolling in this course you must read this Information Booklet and follow the application process outlined in section 11.

This booklet contains details of the way the course will operate and all candidates who are accepted into the CT course must be familiar with its contents. It is the responsibility of each candidate who is accepted into the CT course to follow the guidelines in this booklet.

Nuclear Medicine Technologists who are interested in undertaking the course but need more information should email Rina Harber, CT Course Administrator at [CTAdmin@vsnmt.com](mailto:CTAdmin@vsnmt.com)

## 2. SUPPORT FOR CANDIDATES

Candidates enrolled in the course will be supported by two course advisors. The course advisor for Module 1 is a senior medical physicist with extensive experience in nuclear medicine, CT and education. The course advisor for Modules 2 and 3 is a senior Medical Imaging Technologist with experience in clinical CT, education and research.

In addition to this, each candidate will have an onsite Clinical CT Supervisor who will provide supervision, clinical support and assessments during the clinical CT placement. The course advisor for Modules 2 and 3 will liaise with each Clinical CT Supervisor to ensure satisfactory completion of Module 3.

The VSNMT will also provide administrative support to ensure effective management of the course.

## 3. PROFESSIONAL RECOGNITION

The Medical Radiation Practitioners Board of Victoria has approved this course of study for the operation and use of diagnostic CT within nuclear medicine. Successful completion of the course satisfies the requirements for registration by the Medical Radiation Practitioners Board of Victoria for those clinical situations when a registered nuclear medicine technologist is required to perform a diagnostic CT examination within the context of a PET-CT or SPECT-CT hybrid imaging study. The MRPB Policy decision is available at [http://www.mrp.vic.gov.au/files/pub\\_policy\\_petct\\_imaging.pdf](http://www.mrp.vic.gov.au/files/pub_policy_petct_imaging.pdf)

If you successfully complete the program and are registered by the MRPB, you can apply to have your radiation Use Licence amended. A modification will be added to your scope of practice to include diagnostic CT.

## 4. COURSE ENTRY REQUIREMENTS

- a) Bachelor of Applied Science (Nuclear Medicine), RMIT University commenced in or after 1992, or a Bachelor of Applied Science (Nuclear Medicine) from an accredited tertiary institution and successful completion of the VSNMT's online CT entry assessment.
- b) A statement from the employer acknowledging their support for the candidate.
- c) Clinical placement in CT. Module 3 requires three weeks (3x40 hour weeks) of supervised CT clinical

practice. Candidates are responsible for organising their own Clinical Placement, their Clinical CT Supervisor and ensuring that they have access to a CT scanner. This requirement must be formally documented before candidates can commence the course. Once approved, the site and Clinical CT Supervisor cannot be changed without the **prior** approval of the VSNMT.

The training site is required to have a CT scanner (at least 6 slice) capable of performing the examinations studied in Module 2 of the course. If this is not possible, a period at another site may be organised. Examinations should be able to cover the brain, neck and spine, chest, abdomen and pelvis and the extremities in both child and adult.

## 5. COURSE OUTLINE

### 5.1 General information

As previously stated, the course comprises three study modules:

a) Module 1: Physics of CT Imaging and Dosimetry

*It is suggested that this Module be completed within 6 weeks of the commencement date of the course. There will be two practical sessions offered and attendance at one of these practical sessions is required as part of Module 1.*

b) Module 2: CT Clinical Methods

*To be commenced after successfully completing Module 1.*

c) Module 3: CT Clinical Applications

*To be commenced after starting Module 2.*

Online assessment tasks will be set for each topic as you work through Modules 1 and 2. Successful completion of these assessments is required to complete the course. Module 2 should not be commenced until after successfully completing Module 1. As part of Module 3, candidates must complete a Clinical Workbook which has to be submitted for evaluation as part of the course assessment. The clinical work, Module 3, is not to be commenced until after successfully completing Module 1 and commencing Module 2.

The notes for Modules 1 and 2 are divided into a series of topics. Each topic is provided as a set of learning materials comprising notes (like lecture notes) and readings (e.g. chapters of a text, journal articles, online material/websites). The lecture notes also contain a series of 'activities' or tasks that are done at various times during your study of the topic. These activities are there to help you understand the concepts covered in each topic and they aim to bring together particular concepts. Some activities can be completed without input from your clinical placement in CT, while others are designed to be completed during, or may be enhanced by, your CT placement.

There is a suggested text for the course (see Section 6).

The following is a brief outline of each Module of study.

### 5.2 Module 1: Physics of CT Imaging and Dosimetry

Module 1 comprises four topics designed to build on your prior undergraduate studies in CT, and so prepare you for practising CT in the hybrid imaging environment. Topic 1 is revision.

This Module will:

- a) Introduce you to the theory of CT image acquisition and reconstruction.
- b) Describe the physical components of CT scanners.
- c) Explain the factors which affect CT image quality.
- d) Detail how x-ray dose is measured, and the factors affecting patient dose.

Note that attendance at a practical session will be required as part of Module 1. The practical sessions for the course commencing on Monday 27 February 2012 are tentatively set for 10am-12noon Saturday 25 February in Malvern, and 6.00-8.00 pm Tuesday 28 February in Melbourne CBD.

### 5.3 Module 2: CT Clinical Methods

Module 2, CT Clinical Methods, comprises seven topics designed to build on your learning from Module 1. It also builds on your prior learning from undergraduate studies in CT, and so prepares you for practising CT in the hybrid imaging environment. This Module will:

- a) Describe the concepts and use of contrast agents in CT.
- b) Provide a range of imaging protocols relevant to the current hybrid imaging environment.

Of the seven topics in Module 2, Topics 1 and 2 cover the scientific principles of contrast used in radiography and their clinical use in CT. Topics 3–7 address specific CT imaging protocols relevant to the daily practice of CT in hybrid imaging. Engagement in CT clinical practice (as required for Module 3) is necessary to complete aspects of these topics.

### 5.4 Module 3: CT Clinical Applications

Module 3 is a supervised clinical placement in CT. To complete this Module, candidates are required to spend a minimum of 120 hours in diagnostic CT. The facility in which you will gain your clinical CT experience must be able to offer experience in the full range of studies covered in Module 2. Examinations should be able to cover the brain, neck and spine, chest, abdomen and pelvis and the extremities in both child and adult.

This period of supervised practice is designed to enable you to participate in CT examinations and develop competence in the full range of diagnostic CT examinations, under the direct supervision of a CT radiographer. Your clinical placement in CT can be completed as a full-time three week block i.e. 15 working days / 3x40 hour weeks, or as day release. If day release is chosen, it must be a **minimum of 2 consecutive days per week**. This module must be completed within 8 weeks.

CT placements are organised by the candidate, not the VSNMT. Information about the proposed placement, including the location and Clinical CT Supervisor, must be provided to the VSNMT with the candidate's application for this course. A site visit of the proposed location may be undertaken by the Module 2 and 3 course advisor before the candidate is accepted into the course.

Your clinical work should only commence after successfully completing Module 1 and after commencing Module 2.

## 6. COURSE MATERIALS

The suggested text for the course is *MDCT Physics – The Basics* by Mahadevappa MAHESH. This textbook is available from SPP Medical & Legal Books, Alan Gilbert Building, 161 Barry Street (Corner Grattan and Barry Streets) Carlton Vic 3053. Phone 9341 7000.

### 6.1 Study notes and readings for Modules 1 and 2

To complete the course, it is essential that you have access to a PC/Apple Mac connected to the internet. Your PC/Mac should run the Windows XP operating system (or similar/later versions). Any browser can be used to access the VSNMT website.

The learning materials (study/lecture notes and readings) for Modules 1 and 2 are located on the VSNMT website. Access to these resources is via password, and access will be provided to candidates who are accepted into the course. When you access the course materials you will be able to save the files directly

to your computer hard drive, or to a USB, etc. You can also print a hard copy of the files for personal use. Once a candidate completes the online assessment for a particular topic there is no further access to the notes for that topic.

All files have been converted to PDF to keep them as small as possible and so assist in transfer and downloading. If you encounter problems in downloading any file you need as part of this course, you must contact the course advisor as soon as possible.

***IMPORTANT:** Remember that if you download and store files to disc or print them they are protected by copyright. This means they have been made available to you for your personal use ONLY and you must not copy the files (in full or in part), manipulate them or distribute them for any other reason than to directly support your study of this course, without written permission of the publisher (VSNMT Inc.).*

As this course is offered online, you are expected to regularly check the course discussion board so that the course advisors can maintain contact with you. This contact is essential when advice is forwarded to you with regard to changes to notes or readings. In general, you should aim to check the discussion board at least every 48 hours during your candidature.

## **6.2 Prior learning and Revision**

Modules 1 and 2 provide 'Prior Learning' materials in the form of a list of readings in PDF form that will assist you if you need to revise some of the CT concepts we know you have covered in your previous undergraduate studies.

## **6.3 Module 3**

To complete Module 3 candidates will use the VSNMT Clinical Workbook. This Clinical Workbook is only available in hard copy, and it will be provided to candidates at the practical sessions. The completed Clinical Workbook needs to be returned to the VSNMT as it forms part of the course assessment. The fully completed Clinical Workbook must be received by the VSNMT within one week of the closing date of the course i.e. on or before Friday 22 June 2012. Before submitting your Clinical Workbook ensure all relevant pages are signed by your CT Supervisor. Candidates are advised to keep a photocopy. The original Clinical Workbook will be returned to candidates upon completion of the course assessment period.

## **7. WORKLOAD AND STUDY TIME**

The amount of time each candidate spends studying the topics in this course will vary. However you should aim to spend at least 4 hours on each of the 11 coursework topics in Modules 1 and 2. It is suggested that Module 1 be completed within 6 weeks of the course commencement date. Module 1 must be successfully completed and Module 2 commenced before starting Module 3. Module 2 should be completed within 12 weeks of the commencement date of the course.

**This course is considered to be demanding. Before applying, applicants should ensure that they can devote sufficient time to complete the online learning Modules and undertake the CT clinical placement during the 16 weeks of the course.**

## **8. COURSE ADVISORS, DISCUSSION BOARD AND HELP**

As candidates study each Module in this course they have access to a course advisor via the discussion board. This person is an expert in the content of each module and is experienced in teaching and learning at the graduate level/higher degree level, and they will act as a tutor offering support as candidates work through the learning materials.

Administrative support is also available if candidates require clarification of any administrative issues related to undertaking the course.

As the progress of each candidate is monitored during the course, candidates should notify Rina Harber, CT Course Administrator at [CTAdmin@vsnm.com](mailto:CTAdmin@vsnm.com), if anything occurs which might delay their progress through the course, eg unexpected work pressures, planned leave or similar.

## 9. ASSESSMENT

For Module 1, the examinations are based on the content in the online lecture/study notes. The readings referred to, and the suggested textbook, are considered supplementary material to aid the candidate in understanding the lecture notes. Obviously, the textbook also has value as a future reference, but neither readings nor the textbook are required material for Module 1.

For Module 2, the examinations are based on the content in the online lecture notes and in the readings referred to in the lecture notes.

### 9.1 Plagiarism

Plagiarism occurs when candidates do not acknowledge when they use the ideas of others. To ensure plagiarism does not occur in the conduct of assessment tasks in this course, when completing online tests, candidates will be required to confirm that their answers are entirely their own work via a pop-up check box. Candidates will also sign a similar statement within their Clinical Workbook.

### 9.2 Cheating

Cheating is when a candidate seeks to obtain an unfair advantage in an assessment task. To ensure cheating does not occur in the conduct of assessment tasks in this course, when completing online tests, candidates will be required to confirm, via a pop-up check box, that their answers are entirely their own work and that they comply with the assessment rules governing the task. Candidates will also sign a similar statement in their Clinical Workbook.

### 9.3 Module 1

Each topic is assessed via a series of timed online tests. Each test is timed and comprises a series of short answer questions specific to the topic being examined. Candidates can undertake the short answer questions online as they complete each topic. Questions for each assessment will be selected randomly from a pool of questions for that topic and are available to candidates 24 hours a day. The pass mark is 65%.

When the online test is accessed by the candidate, they will have the specified time (depending on the topic the assessment is 1, 1.5 or 2 hours) to complete the assessment task i.e. responses must be submitted before each assessment task 'times out' at the end of the specified time. In addition to the specific assessments in Module 1, candidates will be required to answer questions relating to the practical session. Answers to each online test and the Practical session exercise will be marked by the Module 1 course advisor and candidates will be notified of their results by email.

Please note:

- Candidates cannot undertake the next assessment until they have received a mark for the previous assessment. This is to allow candidates to take advantage of feedback from each assessment.
- Candidates will be given a mark for each assessment. **If a candidate fails a particular topic, they may have two more attempts at the assessment for that topic.** The course advisor will monitor the number of attempts made by candidates, and if appropriate contact the candidate to follow up and provide advice.
- If you need to re-take any assessment allow yourself time to review and revise the materials and reflect on your learning before reattempting the assessment.

## 9.4 Module 2

Module 2 will also be assessed online. The assessment task for each topic in this module is a set of multiple choice questions (MCQs). Candidates can undertake the MCQs online as they complete each topic. Each set of MCQs contains 20 questions at different levels of difficulty, and questions will be selected randomly from a pool of questions for that topic. When the online test is accessed by the candidate, they will have 1 hour to complete the assessment task i.e. each assessment task will 'time out' after 1 hour. When candidates submit their answers to the set of MCQs they will automatically receive their overall grade. Candidates will be given feedback on the questions that were not answered correctly. Please note:

- Candidates need to complete the online MCQ tests for Module 2 in topic order.
- To satisfactorily complete Module 2 candidates must complete all MCQ tests for Topics 1-7 inclusive. MCQ tests for each topic are available to candidates 24 hours a day.
- Candidates will be given a mark for each assessment. The pass mark is 65%. **If a candidate fails an MCQ test, they may have two more attempts at that MCQ test.**
- There must be a minimum of 24 hours between attempts at an assessment. If you need to re-take any assessment allow yourself time to review and revise the materials and reflect on your learning before reattempting the assessment.
- The course advisor will monitor the number of attempts made by candidates, and if appropriate contact the candidate to follow up and provide advice.

## 9.5 Module 3

Module 3 is assessed in the workplace. Candidates complete a series of clinical skills assessments in CT and the Clinical CT Supervisor will provide feedback regarding the development of competency. All clinical skills assessment forms are in the Clinical Workbook, and they clearly outline the clinical competencies that need to be demonstrated to pass each assessment.

Your Clinical CT Supervisor will also view the CT case studies you complete as part of this Module.

Candidates will keep a log of the CT studies performed during their placement, and supervisors will provide detail on the level of involvement in each study, and an estimate of the candidate's competency. This log will allow Clinical CT Supervisors to monitor developing competency, as well as the range of studies candidates are performing and, if necessary, modify the program to ensure candidates achieve the full range of studies expected. For evaluation as part of the course assessment, the completed Clinical Workbook must be received no later than Friday 22 June 2012.

## 9.6 Exceptional circumstances

Candidates must complete all assessment tasks for Modules 1, 2 and 3, including their 120 hours of clinical CT practice, within the dates allocated to the course. For this course these dates are 27 February to 15 June 2012. Candidates who do not meet this timeline will not be considered to have completed the course satisfactorily. Only in exceptional circumstances will extensions be granted, deferments allowed or cancellations of enrolment permitted. The grounds for issuing an extension, deferment or cancellation will be acute illness, loss or bereavement, family relationship breakdown, hardship or trauma, or jury duty, and all will be based on the submission of documentary evidence.

Applications for an extension, deferment or cancellation of enrolment must be received by the VSNMT within five working days of the relevant event. The decision to provide an extension for an assessment task, deferment of assessment task or enrolment, or cancellation of enrolment will be solely at the discretion of the VSNMT. Such decisions are not open to appeal.

If a deferment is granted, any additional expenses incurred by the VSNMT in relation to the deferment (such as associated with a repeat site visit) must be met by the candidate.

## 10. STATEMENT OF COMPLETION

A Statement of Completion will be issued to all candidates who satisfactorily complete this course. To satisfactorily complete the course, a candidate must:

- a) Achieve a pass grade for the Practical session exercise and all online assessment tasks in Module 1, and
- b) Achieve a pass grade for all online assessment tasks in Module 2, and
- c) Achieve a satisfactory grade for all Clinical Skills Assessments, and
- d) Complete 3 full time weeks/120 hours of supervised CT clinical practice in an approved CT department, and
- e) Complete all course requirements on or before 15 June 2012 and
- f) Provide a signed statement from their Clinical CT Supervisor confirming they are competent to perform routine diagnostic CT, and
- g) Complete and submit their Clinical Workbook on or before 22 June 2012 and have it assessed as satisfactory by the Module 2 and 3 course advisor.

## 11. APPLICATION PROCESS AND SUBMISSION

Candidates can apply to do the Diagnostic CT for Molecular Imaging course by completing the relevant application forms and emailing scanned copies to the VSNMT at [CTAdmin@vsnmt.com](mailto:CTAdmin@vsnmt.com). To apply, complete and send the following to the VSNMT:

- Candidate Application Form.** This is completed and signed by the applicant.
- A Certified Copy of your RMIT University Qualification.** This may be an official transcript of results which includes a statement of successful completion of the course or a copy of your Award. Ensure this document clearly shows when you commenced your course. To have a document certified you should take the original and a copy to an authorised person. The person must then write on every page of the copy document: *'I have sighted the original document and certify this to be a true copy of the original.'* The person should sign each statement and provide their designation, for example, 'Pharmacist'.
- If you commenced your course pre 1992 you must successfully complete the VSNMT's online CT entry assessment before you are eligible to commence this course. Such candidates should contact the course administrator at [CTAdmin@vsnmt.com](mailto:CTAdmin@vsnmt.com) to arrange to undertake the online assessment.
- Employer's Form.** This is completed and signed by the applicant's employer.
- Clinical CT Supervisor's Form.** This is completed and signed by the person who has agreed to be the applicant's Clinical CT Supervisor.

Please complete all forms in **black**. When these forms are completed (fully) and you have your certified copy of your qualifications, you will need to convert them to an electronic document, and submit them via email to:

CT Course Administrator  
Email [CTAdmin@vsnmt.com](mailto:CTAdmin@vsnmt.com)

Please note:

- Applications for the course commencing in February 2012 will only be accepted via email to the address provided above.
- Applications open at 9.00am on Monday 12 December 2011 and close at 4.00pm on Friday 23 December 2011. Applications received at any other time will not be accepted.
- The number of candidates for this course is limited to 25, and applications will be processed in the order of receipt of fully completed applications (without payment).

## 12. TIMELINES

- Fully completed applications will be accepted between 9.00am on Monday 12 December 2011 and 4.00pm on Friday 23 December 2011.
- All applications will be acknowledged.
- CT placement site visits may be undertaken to ensure that appropriate facilities and supervision are available.
- Successful applicants advised of their place in the course, must ensure full payment is received by the VSNMT by 20 February 2012. Payment may be via cheque sent to the CT Course Administrator, VSNMT Inc., PO Box 506, Heidelberg 3084 or credit card (Mastercard or Visa).
- CT course log in and passwords will be distributed to candidates by 24 February 2012.
- This course will commence on 27 February 2012.

## 13. COURSE COST

For the course beginning in February 2012 the course fee is:

- VSNMT members (discounted rate) **\$2200 (GST inclusive)**
- VSNMT non-members (full rate) **\$2750 (GST inclusive)**

To claim the reduced VSNMT member course fee, applicants must be full financial members of the VSNMT. Full course payment is required by 20 February 2012, and failure to pay by this date may result in forfeit of your place. Refund of course fees will only be allowed in the following exceptional circumstances: acute illness, loss or bereavement, family relationship breakdown, hardship or trauma or jury duty. Documentary evidence must be provided by the applicant to support a request for a refund. The decision to issue a refund or part refund of course fees will be solely at the discretion of the VSNMT. Such decisions are not open to appeal. Failure to meet the course requirements (either in terms of time constraints for the completion of the course or successfully completing the assessments and Clinical Workbook) will not constitute grounds for a refund.

## 14. PRIVACY AND CONFIDENTIALITY

All personal and course related information for candidates undertaking this course is stored securely by the VSNMT Inc. The course advisors and course administrator will have access to each candidate's course information, including individual assessment results, for the following purposes:

- a) Monitoring each candidate's progress through the course with a view to providing ongoing academic support and guidance.
- b) Ensuring candidates complete the course as prescribed so that a Statement of Completion can be provided.
- c) Monitoring response rates and duration of assessment tasks for quality assurance purposes.
- d) Providing reports to the VSNMT Education Committee with regard to commencing numbers, completion rates and course duration at 6 monthly intervals. Reports will comprise pooled results only, and no identifying information of any kind (such as candidate name, initials or workplace) will be contained in any report.

Candidate information held by the VSNMT will not be made available to any third party, without the individual consent of candidates, except as required by law. If a candidate wishes to view the information held by the VSNMT with respect to their enrolment in this course, they can do so by contacting the VSNMT Secretary in writing via email to [Secretary@vsnm.com](mailto:Secretary@vsnm.com) or by mail to P.O Box 506 Heidelberg Victoria 3084.