HIGHER SPECIALIST DIPLOMA

Study Guide and

Indicative Syllabus

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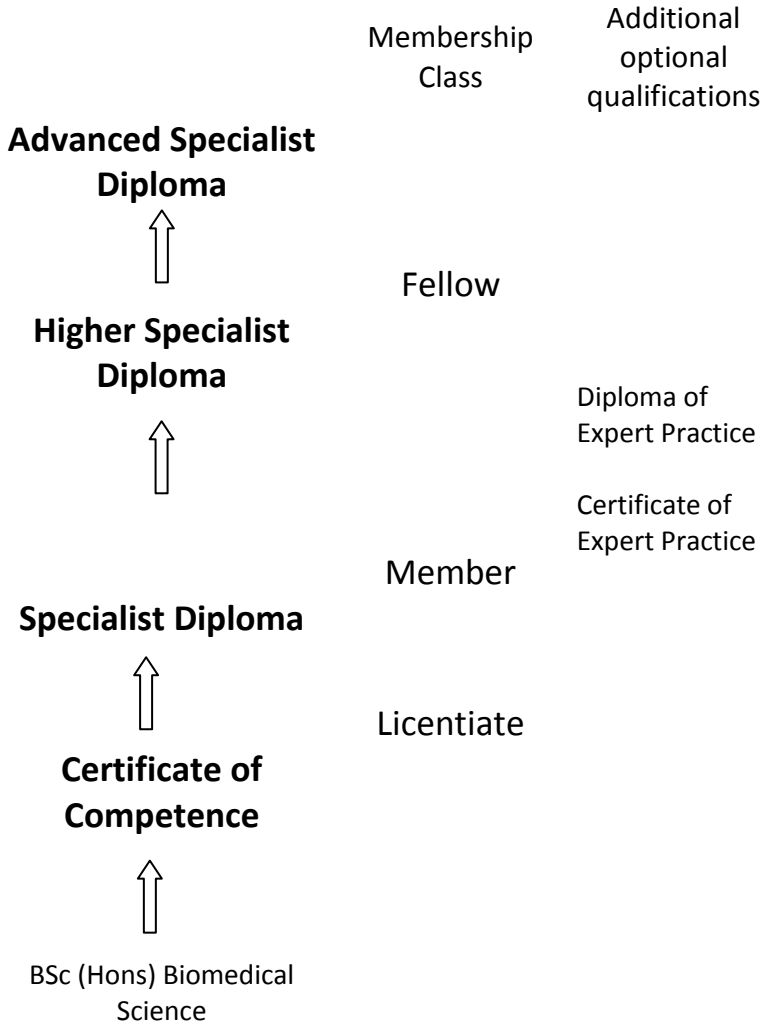
TABLE OF CONTENTS

INTRODUCTION

The Higher Specialist Diploma is a qualification for biomedical scientists wishing to gain knowledge, skills and competence at a higher level.

Individuals wishing to undertake the Higher Specialist Diploma should be biomedical science practitioners, who have developed skills and theoretical knowledge to a very high standard and are performing an in-depth highly complex role, and are continuously developing clinical, scientific or technical practice within a defined field and/or have management responsibilities for a section/small department, or be largely involved in research and development.

INSTITUTE'S EXAMINATION STRUCTURE



GUIDANCE TO CANDIDATES

This study guide is an indication of the main areas covered by the Higher Specialist Diploma (HSD) examination. It does not aim to be a comprehensive detailed syllabus. This is supplemented by further information within the HSD forum on the Institute's website.

This document contains an indicative syllabus aimed at guiding the student to the appropriate topics and resources for study, and should be 'added to' by the candidate to reflect updates in practice and resources available. The study time for this examination could be made up of general reading, laboratory practice, involvement in case studies, presentations, essay writing, attendance at seminars, other relevant professional development activities, and reflective practice relating to the generic study guide and the chosen specialty. Candidates are strongly advised to seek a mentor who can help with their training and learning activities in preparation for the HSD.

The diploma may be awarded in the following subjects:

Cellular Pathology
Clinical Chemistry
Cytopathology
Haematology
Histocompatibility & Immunogenetics
Immunology
Leadership & Management
Medical Microbiology
Transfusion Science
Virology

Eligibility Criteria

The following requirements **MUST** be met by candidates **BEFORE** applications can be accepted:

- current Institute membership in the class of Member or Fellow
- HCPC registration*

A minimum of five years whole-time equivalent post registration experience is recommended.

* Non-UK members will be exempt from this requirement.

Candidates must maintain their membership with the Institute and their registration with the HCPC until the results are ratified and released in order to be certificated for this qualification.

Learning Outcomes

The Higher Specialist Diploma (HSD) is designed to be at M-Level. The learning outcomes of the HSD are subdivided into the following three areas which candidates must be able to demonstrate.

Knowledge and understanding

- Demonstrate a comprehensive understanding of highly complex scientific, technical and managerial aspects of the relevant field of biomedical science as assessed by portfolio essays and examination papers 1 to 4.
- Show a critical awareness of current issues and developments within healthcare and biomedical science as assessed by portfolio essays and examination paper 2.

Professional skills

- Demonstrate self-direction in solving problems and exercising a high degree of personal autonomy in relation to scope of practice as evidenced by portfolio case studies and examination paper 4.
- Demonstrate a systematic application of professional knowledge and understanding in interpretation of complex data to determine action based on best practice as evidenced by portfolio case studies, and examination papers 1 and 4.

Transferable skills

- Demonstrate leadership and communication skills within the healthcare environment as evidenced by portfolio CPD activities, professional profile and examination paper 3.
- Demonstrate the ability to critically reflect in order to inform best practice as evidenced by all aspects of the portfolio.

Assessment Structure

The assessment of the Higher Specialist Diploma consists of two parts:

- Part A - Portfolio of Experiential Learning
- Part B - Written examination

Part A - Portfolio of Experiential Learning

Entry into the written examination is dependent upon obtaining a pass grade for the portfolio of experiential learning. The portfolio is a compilation of documentary evidence which should be at M-level that is gained during the preparation of the HSD examination.

The Institute recognises the difficulties experienced by candidates preparing for an examination without the support of a formal taught course. To help provide a focus for training, the Institute has introduced an evidence requirement around which the candidate

can structure his/her preparation and demonstrate experiential learning for the examination. This will be contained in a portfolio from which selected items (see below) must be submitted to the Institute for assessment prior to entry into the written examination.

To be awarded the Higher Specialist Diploma, candidates must demonstrate that they have the knowledge, skills and competences required to work at a senior level within their chosen discipline. For this reason the successful completion of the Higher Specialist Diploma will be beneficial to those who are in, or aspire to hold, Band 7 job roles. It also enables successful candidates, if they do not already hold it, to apply for Fellow status of the Institute.

As post-graduate study is based on continuing professional development (CPD) and supported by reflective practice, candidates must also be able to demonstrate that they can modify personal professional activity, critically evaluate scientific information sources and methodologies and demonstrate they possess the capacity to carry out such activities autonomously.

Preparation for the Higher Specialist Diploma examination is guided by this IBMS Higher Specialist Diploma Study Guide and Indicative Syllabus which indicates the necessary knowledge, skills and competences in order to satisfy the above mentioned learning outcomes.

Evidence of Experiential Learning

The following items must be submitted to the Institute for assessment:

a) Personal professional profile

This should be 500 words (±10%) and is designed to help candidates focus on the aspects of their practice that have been developed (or are being developed) towards higher specialist practice. It is therefore a description of relevant experience, your current job, responsibilities, the nature and range of duties undertaken, what you have learned and how you are developing their practice as a professional biomedical scientist.

Personal profiles should summarise work experience following achievement of specialist practitioner status and admittance to the Institute class of Member or Fellow. It should include references to specific work, CPD activities, personal training activities, quality control and assurance, audit and training of other staff.

<u>Example:</u>

I am a biomedical scientist employed in an NHS teaching hospital laboratory with a throughput of approximately 900 specimens per day. I am a Member of the Institute of Biomedical Science (MIBMS), registered on the IBMS CPD scheme.

As a specialist biomedical scientist employed in a medical microbiology laboratory I undertake a range of complex investigations using a variety of techniques, including manual, semi-automated and automated techniques to assist in the diagnosis of disease, and monitoring of treatment. I am a member of the departmental emergency out-of-hours service team, which provides a 24-hour service to the accident and emergency department, acute wards, and high dependency and transplant units.

I have responsibility for the day-to-day management of staff and other resources, including allocation of staff to duties and staff training. I am also fully involved in the introduction of new technologies and equipment, and ensure staff work in accordance with local and national quality assurance requirements. Both of these responsibilities require me to keep my professional knowledge up to date and receptive to new developments. I am also safety officer to the department and regularly attend update meetings.

I have recently been involved in the implementation of the British Society for Antimicrobial Chemotherapy (BSAC) method of antimicrobial sensitivity testing into the department as a response to poor results in NEQAS specimens, following attendance at a BSAC training course.

The department acted as a pilot site within the trust for the introduction of a new computerised ordering system. This required me to establish a close working relationship with the procurement department, enabling a systematic review of the departmental expenditure to ensure best value and quality with demonstrable cost savings. I hope to introduce alongside this an electronic stock control system for the microbiology department both to help satisfy Clinical Pathology Accreditation (CPA) requirements and also to streamline ordering within the department.

Following off-site training with an equipment supplier, I was able to introduce the first molecular-based technique into our department resulting in faster turnaround times for clinicians and cost savings to the trust.

b) CPD activities

Part 1

Candidates are required to submit a list of CPD activities that demonstrates how they have studied for the examination. The number of activities to be provided is not specified, as the list is a unique record of a candidate's experiential learning. It should however show that a variety of activities have been undertaken. This could include for example attendance at training events, conferences, meetings and workshops, journal based learning activities, presentations that have been given and courses that have been undertaken.

Blank 'Record of CPD and reflective practice' sheets are available in the Higher Specialist Diploma section in the members' area of the website and in Appendix A of this document. ***(Note: These sheets are exclusive to the HSD Reflective practice sheets in the CPD portfolio must not be used)***

c) Case studies

Case studies should be 1000 words each (±10%) and should be based on specific clinical or management cases or issues, within which you have been directly involved, that relate to laboratory investigations or service delivery. It is important that you do not include something from your departmental archive even if it is an interesting case if you have had no involvement in it.

In clinical case studies, each study must include details of initial clinical presentation, previous medical history, tests performed, differential diagnoses, appropriate ancillary tests, management, treatment and follow-up. The inclusion of illustrations, images and references is encouraged where appropriate. If references are used these should be presented in the Vancouver style. (See below for more information on referencing). They must be summarised under the following headings:

Pre-analysis

Details of presenting symptoms and any additional relevant clinical history, including previous results, should be used to introduce the case. The clinical symptoms may be expanded upon and the possible need for further investigations should be critically discussed to demonstrate that you have considered aetiology and pathogenesis of the disease.

Analysis

The way the specimen is handled when it arrives in the laboratory should be discussed. Previous results should be reviewed and discussed.

Post-analysis

The possible or probable outcomes for the patient should be discussed to include options for follow-up treatment. Discussion should include what could have happened if an error in analysis had been made.

In management and leadership case studies, each study must include details of the fundamental issue, initial investigations, action taken, outcomes and any follow-up. The inclusion of illustrations and references is encouraged where appropriate. They must be summarised under the following headings:

Issue

Details of the issue, and relevant background information, should be used to introduce the study. The management culture and philosophy of the department or employer may be expanded upon and critically discussed to demonstrate that human, financial and service aspects of the matter have been considered.

Investigation

The way the matter is handled when it initially arises, the extent and level to which individuals are involved and the process for gathering evidence and information should be discussed. Previous related experience may be referenced if relevant to the case and decision-making process.

Action and outcome

The outcomes of the situation should be discussed, indicating whether a satisfactory resolution was achieved and the subsequent implications for individuals or the service. Include any options for follow-up action or review. Discussion should include what could have happened if action had not been agreed.

d) Essays

Structured reading requires the submission of two essays based on titles published on the HSD section of the Institute website.

Essays must demonstrate that the learning outcomes have been met and guidance on the completion of the essays is available on the HSD section of the Institute website.

The essays can be spread over two years therefore whilst both essays can come from the list of the year that is intended that the portfolio is submitted candidates are permitted to undertake one of the essays from the preceding years' list.

Regulations for essays

In relation to the essays candidates must note that:

1. The Institute will, in the same way that most universities do, be using plagiarism detection software (Turnitin). Plagiarism will result in an automatic failure and potentially a ban from future assessments, pending the outcome of the appeals procedure if invoked. Depending on the nature and frequency of the offence it may also mean the candidate breaches the Institute Code of Professional Practice and could result in disciplinary action. Guidance on avoiding plagiarism can be found on the website.
2. References should appear in Vancouver format as shown below.
3. Essays should be 3000 words (±10%) and typed out in double spacing with a font size of at least 12 point.
4. The essays should be the candidates own work.

Instructions for references in Vancouver (author-number) style

The Vancouver system uses a number series to indicate references. Each piece of work cited in your work, including any duplication of any diagrams, figure, chart or picture, should have a unique number and should be listed in numerical order as

they appear in the text. The number should be written in superscript. If you use a direct quote from a book, article, journal etc you must use single quotation marks. The advantage of the Vancouver style is that the main text reads more easily, and it is considered to be less obtrusive.

References are then listed in the References section in numerical order, as below.

Books (Printed)

Author/Editor (if it is an editor put (ed.) or (eds.) after the name)
Title (should be put in italics)
Edition (if not the first edition)
Place of publication
Publisher
Year of publication

Where there are more than six authors' names, the first three should be included, followed by *et al*

Lane K, Grinspoon L, Bakalar JB. *Marijuana: the forbidden medicine*. Yale University Press, 1993

Lane K, Feinberg TE, Farah MJ. (Eds.) *Behavioural neurology and neuropsychology*. 2nd ed. McGraw-Hill, 1997

Journal article: print

Author
Title of journal article
Title of journal (this should be put in italics)
Year of publication
Volume (Issue) number
Page number of the article

For example:
Chibber PK, Majumdar SK. Foreign ownership and profitability: Property rights, control, and the performance of firms in Indian industry. *Journal of Law & Economics* 1999;42(1): 209-238.

Further information, including how to reference from electronic journals, standards, web pages, websites, reports, newspaper articles, personal communication and conference papers can be found on the following websites:

http://www.imperial.ac.uk/media/imperial-college/administration-and-support-services/library/public/vancouver.pdf
http://subjects.library.manchester.ac.uk/ld.php?content_id=2285398
https://www.southampton.ac.uk/library/resources/documents/vancouverreferencing.pdf

e) Oral presentation

A copy of the transcript or PowerPoint slides from an oral presentation which the candidate has delivered to a specialist or non-specialist audience. The evidence should demonstrate that the candidate has introduced the subject, dealt systematically with the issues and communicated the conclusions clearly to the audience.

Evidence should be provided on the feedback gained by the candidate from doing this presentation. This could be in the form of a summary of completed evaluation questionnaires or feedback from supervisor or manager on the presentation. Candidates should reflect on their experience of undertaking the presentation as part of the requirement to provide three reflective statements. (See below)

f) Reflective Statements

Reflection is an important part of any learning activity. The portfolio should therefore be supported by three reflective statements. These statements should highlight what candidates consider they have learned from undertaking the above activities, what doing the activities means for their on-going professional practice and how they believe they meet each of the following three M-level learning outcomes:

- Deal with complex issues systematically and creatively and communicate findings to specialists and other professional groups.
- Demonstrate self-direction and originality in problem-solving across a variety of areas.
- Continue to advance their knowledge and understanding, and to develop new skills to a high level and possess the necessary qualities and transferable skills at an advanced professional level.

There should be one statement for each of the three learning outcomes above. Each statement should each be of 1000 words (± 10%) and it must be supported by reference to selected examples from the personal professional profile, CPD activities, essays, case studies and oral presentation which are to be submitted in the portfolio.

Blank 'Record of CPD and reflective practice' sheets are available in the Higher Specialist Diploma section in the members' area of the website and in Appendix A of this document. ***(Note: These sheets are exclusive to the HSD Reflective practice sheets in the CPD portfolio must <u>not</u> be used)***

More information on reflection can be found here:
www.port.ac.uk/media/contacts-and-departments/student-support-services/ask/downloads/Reflective-writing---a-basic-intro.pdf

Submission and Marking of the Examination Portfolio

Two copies of the portfolios must be submitted for assessment (one electronic copy and one hard copy) by the published deadline, which will be three months prior to the date of the written examination. The exact date will be published in advance in *The Biomedical Scientist* and the HSD section of the Institute's website. The Institute will endeavour to carry out all portfolio assessments within eight weeks of the submission deadline.

The following items must be submitted in the form of an examination portfolio as evidence of your experiential learning.

a) Personal professional profile

b) Other CPD activities

c) Two case studies

d) Two essays

e) Oral Presentation

f) Three reflective statements covering of all the above points

CPD and reflective practice record sheets are available on the website.

Portfolios are formally assessed by the Institute's examiners for M-level achievement against the Higher Specialist Diploma learning outcomes. Each portfolio is double-marked and if there is substantial disagreement a third independent will be asked to review and make a judgement.

Appendix B shows the portfolio assessment indicators for the Higher Specialist Diploma and candidates are advised to refer to these as checklist before submitting their portfolio. Each portfolio is marked by two examiners and if there is a discrepancy in judgement a third independent examiner will review the portfolio to make a final decision.

Portfolios will be awarded a 'pass' or marked as 'refer' or 'fail'.

Pass

Candidates whose portfolio is marked as a pass will be notified of their eligibility to enter the examination. It is normal practice for candidates to enter the examination in the same year that their portfolio is judged to have passed but candidates may, on request, defer their first attempt at the examination until the following year.

Passed portfolios are valid for up to **two** attempts of the Higher Specialist Diploma examination.

Refer

On review the portfolio examiners may decide that a portfolio has not yet met the required standards but is close to doing so. These portfolios will be marked as a 'refer'. In these circumstances individuals will be notified by the Institute of the shortcomings and will be given a further three weeks to address these issues. The additional evidence must be submitted by the deadline stated by the Institute at which time it will be re-assessed. At this point the portfolio will be either be awarded a 'pass' or 'fail'.

If a candidate does not submit the additional evidence by the deadline stated by the Institute this will result in an automatic fail but these candidates will be able to re-submit in the following year.

Fail

Candidates whose examination portfolio is deemed to have significant deficiencies and therefore not to have met the requirements of the qualification will be marked as a fail. These candidates will not be permitted at this stage to proceed to sit the examination.

Resubmission of portfolios

Candidates who wish to resubmit their portfolio for assessment will be required to address the deficiencies identified by the assessors and submit the portfolio the following year by the stated deadline, accompanied by the portfolio re-assessment fee.

In addition candidates who re-submit their portfolio must ensure that the evidence presented within the revised portfolio is current to their practice at that time (i.e. should not normally exceed five years and reflects the training and experience gained in the period since the initial assessment of the portfolio.

After resubmission and reassessment any portfolios that are still deemed not to have met the requirements of the qualification will be again marked as a fail. These portfolios are not valid for a further re-submission and candidates must re-apply to undertake the qualification and must construct a new portfolio for assessment.

Part B – Written examination

The HSD written examination consists of four papers as follows:

- **Paper One** (Short answer questions – 60 minutes)
  Candidates are required to complete a total of 10 questions (without choice) in 60 minutes.

- **Paper Two** (Generic questions – 120 minutes)
  Candidates are expected to answer three questions, relating their answers to both the wider context as well as the chosen specialty as appropriate. There will be one pre-released mandatory question which will be made available to candidates on the Institute's website at least three weeks before the first examination day.

Candidates will then be expected to answer two further questions from a choice of four.

- **Paper Three** (Discipline-specific questions –120 minutes)
  Candidates are expected to answer three from six questions in their chosen specialty.

- **Paper Four** (Case studies – 120 minutes)
  This paper will comprise three case studies, one pre-seen and two unseen. The pre-seen case study will be made available to candidates on the Institute's website at least seven days before the date of the first examination day.

Pre-Released Questions

Candidates should use the period between the release of the pre-seen question for the generic paper and the pre-seen case study and the examination to prepare the answers for these questions.

Candidates who wish to receive a hard copy of either the pre-seen question for the generic paper or the pre-seen case study must contact the Head of Examinations no later than 21 days before the date of the first examination day.

Candidates should note that they are NOT permitted to take any prepared materials into the examination room itself and that the pre-released questions carry equal weight to the other questions in the examination.

Past Examination Papers

Candidates are strongly recommended to review the past papers that are available in the HSD section of the IBMS website. It should be noted that papers are only made available for the years' that there were candidates sitting that particular discipline. Past papers are not made available for Paper 1 (Short-Answer Questions) and model answers are not provided for any paper.

Marking process and structure

Like the portfolios all examination papers will be marked by two examiners, referring to a third, independent, examiner if appropriate.

All papers carry equal marks, with the overall pass for the examination being 50%, with no individual papers scoring below 40%. Candidates who do not attain an overall pass would be expected to re-sit all four examination papers.

Appendix C shows the marking criteria for the written examinations which is used by the examiners when developing the marking criteria for the generic paper, essay paper and case study papers.

Examination date and venue

The Higher Specialist Diploma examinations will be held over two consecutive days. The dates and venue will be published in *The Biomedical Scientist* and posted on the Institute website. The detailed itinerary will be sent to candidates following a successful outcome in the portfolio assessment.

Conditions

The Higher Specialist Diploma examinations, and all other Institute examinations, are governed by the *Rules for Conducting Examinations*, a copy of which can be found under 'General Information' on the HSD page of the Institute website.

Deferrals and withdrawals

Candidates who wish to **defer** entry to an examination must contact the Institute a minimum of six weeks prior to the date of the examination will be entitled to a full transfer of their fees. Any deferrals made after this deadline will only be entitled to a 50% fee transfer unless proven mitigating circumstances exist. A maximum of two deferrals is permitted.

Candidates wishing to **withdraw** from an examination at any time will not be entitled to any reimbursement of the examination fee unless proven mitigating circumstances exist.

Candidates who are required to submit a portfolio for reassessment following a referral would be required to pay a reassessment fee.

Candidate support

Candidates who wish to participate in discussions about the Higher Specialist Diploma or exchange information in their relevant disciplines or specialties may do so by accessing the HSD forum in the members' area of the Institute's website.

In addition the Institute hosts Candidate Preparation Days aimed at both those thinking of undertaking the HSD and those already registered on the qualification. This day includes presentations on the completion of the portfolio and examination techniques and workshops with examiners for the various disciplines where past examination papers are discussed so that delegates are aware of the demand of the qualification and examination. These events will be advertised on the Institute website.

Special needs

Candidates with special needs are required to notify the Institute in writing at the time of their application. Any change in needs must be brought to the attention of the Institute as soon as possible prior to the examination. The Institute will make every endeavour to accommodate the needs of such candidates for example through the provision of extra time to undertake the examination, large print papers or IT equipment.

Mitigating circumstances

Any mitigating circumstances, which may affect examination performance or attendance, must be put in writing to the Institute, with the inclusion of any supporting evidence, e.g. doctor's certificate. Once written evidence is received, the matter will be brought to the attention of the appropriate examination board for consideration. This board will consider

whether any adjustments should be made to the marks given to the candidate concerned because of these mitigating circumstances.

Candidates who are unable to attend the examination for a reason deemed acceptable by the examination board may defer entry to the following year without financial penalty.

Notification of results
Candidates will be informed of their results in writing following ratification by the examination board.

Appeals
Any candidate who wishes to appeal against the outcome of the examination must contact the examinations department to request an appeals form. This must be completed and returned to the Examiners Manager within a maximum period of 40 days following publication of the results.

Application form
Application forms are available from the Institute's Office using the contact details below and may be requested by telephone or e-mail, or they may be downloaded from the Institute's web site.

The completed application together with the correct fee must be returned to the Institute. Fees can be paid for through the provision of a personal cheque, credit or debit card payment or by a purchase order from your Hospital Trust.

Incomplete, illegible or applications without fees will be returned for correction and resubmission before acceptance.

Confirmation of application
Once accepted, candidates will be sent a confirmation of candidacy and a reminder of the submission deadline for examination portfolios.

Enquiries
All enquiries relating to the Higher Specialist Diploma must be addressed to:
Head of Examinations
Institute of Biomedical Science
12 Coldbath Square
London EC1R 5HL
Tel: 020 7713 0214 ext 142
E-mail: examinations@ibms.org

HIGHER SPECIALIST DIPLOMA

GENERIC STUDY GUIDE

INDICATIVE SYLLABUS

Education and training

- Academic qualifications
- Institute professional examinations
- Health and Care Professions Council
- Principles and practice of training
- Continuing professional development
- National Occupational Standards
- Knowledge and Skills framework

Quality management

- Staff appraisal
- Personal development plans
- Audit
- Quality assurance
- Internal quality control/assessment
- External quality assessment schemes
- Error logging
- Accreditation
- Clinical governance
- Document control

Laboratory management

- Health and safety
- Workforce planning
- Laboratory information management systems
- Budget management
- Personnel policies
- Change management
- Service configuration and delivery
- Benchmarking
- Disease monitoring and reporting

LABORATORY LEADERSHIP AND MANAGEMENT

INDICATIVE SYLLABUS

An in-depth understanding of current knowledge and practice relating to:

Management and leadership

- Understanding of management and leadership styles and qualities
- Purpose of effective business planning including purpose and construction of business cases for service change or development
- Principles of laboratory budget management and the procurement of reagents, materials and equipment for the laboratory
- Standards and guidelines for management and governance of point-of-care testing
- Development of short-, medium- and long-term resource planning
- Effective team building and staff management
- Role of human resources in relation to staffing and employment issues
- Purpose and application of local disciplinary policy
- Methods for monitoring and assessment of ongoing performance of teams and individuals
- Implications of pathology modernisation on service delivery
- Effective change management

Protocols and procedures

- Development, implementation and interpretation of policies and protocols
- Intended purpose, correct use, side effects and possible contraindications of a proposed method or technique
- Purpose of clinical review and audit
- Records and results maintenance
- The implications of national, international and legal directives

Training and development

- Purpose and requirements of registration with the HPC
- Role of the training officer

- Significance of learning objectives and assessment within the appraisal process
- Significance and purpose of CPD and reflective practice in assessing learning outcomes
- Purpose of competency assessment and the methods used to achieve this

Health and safety

- Purpose and methods of COSHH and risk assessments relevant to work activity, to include safety audits
- Methods of waste and hazardous material disposal and the implications of non-compliance
- Relevant health, safety and security legislation and its application in the laboratory
- Role and responsibilities of the laboratory health and safety officer
- Significance of organisation and departmental health and safety policies in respect of staff, patient and visitor well-being.
- Role of the organisation's occupational health service

Specimens

- Legal regulations and implications relating to the collection of samples
- Range and type of equipment and procedures used in the preparation and storage of specimens, including their correct use, maintenance and application
- National legislation and guidelines on storage, retention and disposal of specimens
- Relevant international, national and local guidelines and regulations relating to packing, labelling and transport of specimens
- Local, national and legal guidelines and regulations for the retention of specimen results and records

Result interpretation

- Normal and abnormal findings and their significance in relation to investigations performed
- Methods of data interpretation in order to extract relevant and accurate results
- How to conduct a critical review of data
- National and international standards/guidelines
- Analytical values, detection limits, method ranges, method interference

- Reference ranges (age/gender)
- Recognition of error
- Reflex testing

Quality management

- The purpose and application of quality control and assurance systems
- The purpose and application of laboratory accreditation systems
- The purpose, construction and application of a quality manual
- Role of the quality manager
- Role of audit in quality control and risk management
- Significance and implications of clinical governance
- Application of the *IBMS Good Professional Practice For Biomedical Scientists* guidelines
- Principles of quality auditing and the process for conduct and audit investigation
- Storage and archiving of data and implications relating to storage of patient results

Quality assurance

- IQC / IQA / EQA: the differences and usefulness of each
- Accreditation
- Audit
- Specificity / sensitivity criteria
- Management of errors, incidents and non-conformances
- Quality improvement

Awareness of knowledge/practice related to laboratory management

- Current government strategy for training and development of the health service workforce
- Purpose and construction of an organisation's mission statement, policies, objectives and values, and how these relate to departmental strategic planning
- Influence and importance of analysing external factors and conditions when developing an organisational or departmental strategy

- Potential impact of government health service reforms on healthcare delivery
- How to produce reports and recommendations to assist in further action in relation to pathology in health and disease
- Organisational risk management and risk reduction strategies

Awareness of research and developing practice

- Developments in delivering learning, including IT-based learning systems
- Developing use of KSF profiles, reflective practice and competency assessment styles in staff development
- Request management.

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS

Garcia LS. (Ed in Chief) *Clinical Laboratory Management*. 2nd ed. ASM Press; 2013. ISBN-10: 1555817270

Gottwald M, Lansdown GE. *Clinical Governance: Improving the quality of healthcare for patients and service users.* Open University Press; 2014. ISBN-10: 0335262805

McSherry R, Pearce P. *Clinical Governance.* 3rd ed. Wiley-Blackwell; 2010. ISBN-10: 144331116

Minzberg M. *Managing (Financial Times Series).* Financial Times/Prentice Hall; 2011. ISBN-10: 027374562X

Mullins L. *Management and Organisational Behaviour.* 11th ed. FT Publishing International; 2016. ISBN-10: 1292088486

Rees WD, Porter C. *Skills of Management*. 6th ed. Cengage Learning, 2008. ISBN – 978-1-84480-645-4

JOURNALS

Health Service Journal *Health and Care Management*
Lancet *The Biomedical Scientist*

Up-to-date recommendations on textbooks, journals and websites may be found on the IBMS website: www.ibms.org

CELLULAR PATHOLOGY

INDICATIVE SYLLABUS

An in-depth understanding of current knowledge and understanding of the following:

- Tissue recognition
  - Skin
  - Soft tissue and bone
  - Cardiovascular system
  - Gastrointestinal system
  - Liver
  - Reproductive system
  - Urinary system
  - Immune system
  - Endocrine system

- Organ systems
  - Physiology of the main organ systems
  - Pathology of the main body systems
    i) Incidence
    ii) Aetiology
    iii) Pathogenesis
    iv) Pathology
    v) Sequalae
    vi) Outcome

- Microscopy
  - Bright field
    i) Köhler illumination
    ii) Oil immersion
    iii) Polarising microscopy
  - Fluorescence

- Disease classification
  - SNOP/SNOMED
    i) Topography
    ii) Morphology
    iii) Disease
    iv) Procedure
  - Audit
    i) List generation
    ii) Multidisciplinary team meetings
  - Cancer registry

- Immunohistochemistry
  - Rationale of methodology
  - Antibody knowledge

i) Staining patterns
ii) Clinical value
iii) Limitations and interferences

- Use of panels
- Detection systems
  i) ABC
  ii) APAAP
  iii) Dextran polymers
- Chromogens
  i) DAB
  ii) AEC
- Antigen retrieval
  i) Rationale
- Immuno-therapeutics
  i) Her-2
  ii) GIST
- Immunofluorescence
  i) Skin
  ii) Renal
- Automation

- Staining methods
  - H & Es
  - Special stains
    i) Carbohydrates
    ii) Connective tissue
    iii) Infective agents
    iv) Amyloid
  - H & S

- Staining and slide preparation
  - Manual staining
  - Automated staining
  - H & S

- Sampling and processing techniques
  - User information
  - H & S
  - Fixation
  - Prioritisation/triage
  - Dissection/sampling
  - Processing
    i) By hand
    ii) Urgent
    iii) Paraffin
    iv) Resin
    v) Microwave

- Embedding

- Laboratory equipment
  - Tissue processors
  - Embedding centres
  - Microtomes
  - Staining machines
  - Immunostaining machines

- Imaging / photography
  - Macrophotos
  - Microphotos

Candidates are expected to have an awareness of the following:

- Patient management

- Clinical interpretation

- Molecular diagnosis
  - ISH

- Electron microscopy

- Neuropathology

- Paediatric pathology

Awareness and developing practice

- Screening

- Cancer targets

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS

Abrahams PH, Spratt JD, Loukas M, Van Schoor AN. *McMinn's and Abrahams' Clinical Atlas of Human Anatomy.* 7th ed. Mosby; 2013. ISBN-10: 0723436975

Allen DC, Cameron RI (Eds.) *Histopathology Specimens: Clinical, Pathological and Laboratory Aspects*. 3rd ed. Springer; 2017. ISBN-10: 3319573594

Bancroft JD, Layton C and Suvarna K S. *Bancroft's Theory and Practice of Histological Techniques.* 7th ed. Churchill Livingstone; 2012. ISBN-10: 0702042269

Cook DJ, Warren PJ. *Cellular Pathology*; *An Introduction to Techniques and Applications.* 3rd ed. Scion Publishing Ltd; 2015. ISBN-10: 1907904352

Cross S*. Underwood's Pathology.* 6th ed. Churchill Livingstone; 2013. ISBN-10: 0702046728

Dabbs DJ. *Diagnostic Immunohistochemistry: Theranostic and Genomic Applications.* 4th ed. Saunders; 2013. ISBN-10: 1455744611

Gartner LP. *Color Atlas and Text of Histology.* 7th ed. Lippincott Williams & Wilkins; 2017. ISBN-10: 1496346734

Gartner LP, Hiatt JL. *BRS Cell Biology and Histology*. 7th ed. Lippincott Williams & Wilkins; 2014. ISBN-10: 1451189516

Hannon-Fletcher M, Maxwell P. (Eds.) *Advanced Techniques in Diagnostic Cellular Pathology.* Wiley-Blackwell: 2009. ISBN-10: 047051597X

Herrington CS. (Ed.) *Muir's Textbook of Pathology*. 15th ed. CRC Press; 2014. ISBN-10:1444184970

Kierszenbaum A and Tres L. *Histology and Cell Biology: An Introduction to Pathology.* 4th ed. Saunders; 2015. ISBN-10: 0323313302

Kumar V, Abbas AK, Aster JC. *Robbins & Cotran Pathologic Basis of Disease.* 9th ed. Saunders; 2014. ISBN-10: 1416031219

Kumar P and Clark M. *Kumar and Clark's Clinical Medicine.* 8th ed. WB Saunders; 2012. ISBN-10: 0702044997

Lowe J, Anderson P. *Stevens and Lowe's Human Histology.* 4th ed. Mosby; 2014. ISBN-10: 0723435022

Mills SE. *Histology for Pathologists*. 4th ed. Lippincott Williams & Wilkins; 2012. ISBN-10: 145111303X

Mitchell R, Kumar V, Fausto N, Abbas AK and Aster JC. *Pocket Companion to Robbins and Cotran Pathologic Basis of Disease*. 8thed. Saunders; 2011. ISBN-10: 1416054545

Orchard G, Nation B. (Eds.) *Histopathology (Fundamentals of Biomedical Science).* 2nd ed., OUP, Oxford; 2017. ISBN-10: 0198717334

Orchard G, Nation B. *Cell Structure and Function (Fundamentals of Biomedical Science).* OUP; Oxford, 2014. ISBN-10: 0199652471

Paulsen DF. *Histology and Cell Biology: Examination and Board Review.* 5th ed. Mc Graw- Hill Medical; 2010. ISBN-10: 0071476652

Young B, Woodford P and O'Dowd G. *Wheater's Functional Histology: A Text and Colour Atlas.* 6th ed. Churchill Livingstone; 2013. ISBN-10: 0702047473

JOURNALS

Archives of Pathology and Laboratory Medicine
American Journal of Clinical Pathology
British Journal of Biomedical Science
Histopathology
Journal of Clinical Pathology
Journal of Histochemistry
Journal of Histochemistry and Cytochemistry
Journal of Pathology
Lancet
The Biomedical Scientist

WEBSITES

UKNEQAS Immunocytochemistry Journal — www.ukneqasicc.ucl.ac.uk/neqasicc.shtml

Up-to-date recommendations on textbooks, journals and websites may be found on the IBMS website: www.ibms.or

CLINICAL CHEMISTRY

INDICATIVE SYLLABUS

Candidates should be able to demonstrate in-depth knowledge, understanding and application of the following:

- Normal physiological and biochemical parameters, understanding the variation caused by age and disease states
- Appropriate introduction and use of analytical techniques and the clinical governance issues associated with them
- Analytical procedures and instrumentation
- Sources of peri-anlaytical variation and errors and procedures to manage them
- Test requesting and samples
- Interpretation of biochemical data
- Point-of-care analysis and governance
- Quality management schemes
- Selection of appropriate technique or method for laboratory investigation
- Principles and practice of determining normal, abnormal and target values
- Understanding the disease processes
- The function of the major organs and systems:
  - Kidney and renal function
  - Liver and hepatic function
  - Gastrointestinal tract
  - Endocrine system
  - Skeletal system
  - Nervous system
  - Cardiovascular system
- Endocrine disorders
- Carbohydrates
- Lipids
- Proteins and amino acids
- Biochemical genetics

- Biochemistry of malignancy
- Toxicology
  - Monitoring of therapeutic drugs
  - Identification of drugs of abuse
- Biochemistry of pregnancy
- Biochemistry of nutrition
- Paediatric biochemistry
- Biochemistry of the elderly

Awareness of areas of knowledge/practice related to clinical biochemistry

- Molecular techniques
- Normal ranges and predictive values of pathology tests used to support clinical biochemistry investigations

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS

Ahmed N. (Ed.) *Clinical Biochemistry. (Fundamentals of Biomedical Science)* Oxford OUP; 2011. ISBN-10: 0199533938

Baynes J, Dominiczak M. Medical Biochemistry. 4th ed. Saunders; 2014. ISBN-10: 1455745804

Bishop ML, Fody EP, Schoeff LE. *Clinical Chemistry: Principles, Techniques and Correlations.* 7th ed. London: Lippincott, Williams and Wilkins; 2013. ISBN-10: 1451118694

Burtis CA, Bruns DE. *Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics*. 7th ed. Saunders; 2014. ISBN-10: 1455741655

Crook MA. *Clinical Chemistry and Metabolic Medicine*. 8th ed. CRC Press; 2012. ISBN-10: 1444144146

Flanagan RJ, Taylor A, Watson ID, Whelpton R. *Fundamentals of Analytical Toxicology.* Wiley-Blackwell; 2008. ISBN-10: 0470319356

Gardner A, Davies T. *Human Genetics.* 2nd ed. Scion Publishing; 2009. ISBN-10: 1904842739

Gaw A, Murphy MJ, Cowan RA, O'Reily DSt.J, Srivastava R. *Clinical Biochemistry: An Illustrated Colour Text.* 5th ed. Churchill Livingstone; 2013. ISBN-10: 0702051799.

Kaplan LA, Pesce AJ. *Clinical Chemistry: Theory, Analysis, Correlation.* 5th ed. St Louis: Mosby, 2009. ISBN-10: 0323036580

Marks AD, Liberman M. *Basic Medical Biochemistry.* 4th rev. International ed. Wolters Kluwer; 2012. ISBN-10: 1451100035

Marshall WJ, Bangert SK, Laplsey M. *Clinical Chemistry.* 7th ed. Churchill Livingstone; 2012. ISBN-10: 0723437033

Marshall WJ, Lapsley M, Day A, Ayling R. *Clinical Biochemistry: Metabolic and Clinical Aspects.* 3rd ed. Churchill Livingstone; 2014. ISBN-10: 0702051403

JOURNALS

Annals of Clinical Biochemistry
BMJ
British Journal of Biomedical Science
Clinical Biochemistry
Clinical Chemistry
Clinical Endocrinology
Clinical Laboratory Science
Diabetes Research and Clinical Practice
European Journal of Medicinal Chemistry
Health Service Journal
Journal of Clinical Laboratory Analysis
Journal of Clinical Pathology
Lancet
The Biomedical Scientist
Therapeutic Drug Monitoring
Trends in Analytical Chemistry

CYTOPATHOLOGY

INDICATIVE SYLLABUS

General cytopathology

An in-depth understanding of current knowledge and practice relating to:

- sampling techniques
- transport and storage of cytology specimens
- preparation and routine staining techniques
- cell morphology
- disease classification
- pathology of main body systems
- normal cytology and cytopathology of body systems
- use of immunohistochemistry
- interpretation of the cytological diagnosis in clinical management of the patient
- role of multidisciplinary teams
- quality management systems.

Awareness of research and developing practice

- New diagnostic technologies

Cervical cytology

An in-depth understanding of current knowledge and practice relating to:

- anatomy and physiology of the female genital tract
- purpose, aims and organisation of the NHS cervical screening programme
- sampling and preparation techniques
- morphology
- disease classification
- pathology of the female genital tract

- role of quality assurance.
- role of MDTs in the diagnosis and management of cervical disease
- application of IT systems in cervical cytology
- quality management systems
- new screening technologies
- multidisciplinary teams
- transport and storage of liquid-based cytology samples.

Awareness of areas of knowledge / practice related to cervical cytology

- Accreditation standards and legislation relevant to cervical cytology
- Storage and retention of documentation

Awareness of research and developing practice

- Molecular technologies
- Vaccination

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS

Ali SZ, Parwani AV. *Breast Cytopathology.* Springer; 2007. ISBN-10: 0387715940

Bibbo M, Wilbur D. *Comprehensive Cytopathology.* 4th ed. Saunders; 2014. ISBN-10: 1455751952

Day P. *Fine Needle Aspiration Cytology: Interpretation and Diagnostic Difficulties*. 2nd ed. Jaypee Brothers Medical Publishers; 2015. ISBN-10:9351526089

DeRay RM. *The Art and Science of Cytopathology.* 2nd ed. American Society for Clinical Pathology Press (ASCP); 2012. ISBN-10: 0891896449

DeRay RM. *The PAP Test.* American Society for Clinical Pathology Press (ASCP); 2005. ISBN-10: 0891894209

Ductaman BS, Wang HH. (Eds.) *The PAP Smear*. CRC Press; 2002. ISBN-10: 0340759283

Gattuso P, Reddy V, Masood S. (Eds.) *Differential Diagnosis in Cytopathology*; Cambridge University Press; 2014. ISBN-10: 1107040299

Gray W, Kocjan G. *Diagnostic Cytopathology*. 3rd ed. Churchill Livingstone; 2010. ISBN-10: 0702031542

Kini SR. *Color Atlas of Differential Diagnosis in Exfoliative and Aspiration Cytopathology*. 2nd ed. Lippincott Williams and Wilkins; 2011. ISBN-10: 1608312755

Kocjan G, Gray W, Levine T, Kardum-Skelin I, Vielh P. *Diagnostic Cytopathology Essentials.* Churchill Livingstone; 2013. ISBN-10: 0702044504

Koss LG, Melamed MR. (Eds.) *Koss' Diagnostic Cytology and its Histopathologic Bases.* 5th ed. Lippincott Williams and Wilkins; 2005. ISBN-10: 0781719283

Layfield L. *Atlas of Fine Needle Aspiration Cytology.* Jaypee Brothers Medical Publishers; 2014. ISBN-10: 935152117

Orell SR, Sterrett GF, Whitaker D. *Fine Needle Aspiration Cytology.* 4th ed. Churchill Livingstone; 2005. ISBN-10: 0443073643

Sellers JW, Sankaranarayanan R. *Colposcopy and Treatment of Cervical Intraepithelial Neoplasi: A Beginners' Manual.* IARC, 2003. ISBN-10: 9283204123

Shambayati B. (Ed.) *Cytopathology (Fundamentals of Biomedical Science).* Oxford University Press (OUP); 2011. ISBN-10: 019953392X

Stevens A, Lowe J, Scott I. *Core Pathology*. 3rd revised Ed. Mosby; 2008. ISBN-10: 0723434441

JOURNALS

Acta Cytologica
British Journal of Obstetrics and Gynaecology
Current Diagnostic Pathology
Diagnostic Cytopathology
The Biomedical Scientist
British Medical Journal
Cytopathology
Cancer Cytopathology
Journal of Clinical Pathology

WEBSITES

NHSCSP website for list of publications pertaining to cervical screening in UK
http://www.cancerscreening.nhs.uk/index.html

OTHER PUBLICATIONS

NHS Cervical Screening Programme Publications
Statistical Bulletin

Up-to-date recommendations on textbooks, journals and websites may be found on the IBMS website: www.ibms.org

HAEMATOLOGY

INDICATIVE SYLLABUS

The following sections outline the requirements for completion of a course of study for the Higher Specialist Diploma in haematology.

A complete and thorough understanding of general haematology including:

- methodologies used in routine and specialist biomedical science laboratories
- diagnostic pathways and treatment options
- haematological results in health and disease
- current trends in the diagnosis, laboratory techniques, treatment and clinical practice, including BCSH guidelines.

Knowledge of the above must encompass the following areas:

- Red cell haematology
- White cell haematology
- Image analysis and morphology
- Haemostasis and thrombosis
- Haemoglobinopathies, enzymopathies and red cell membrane defects
- Haematinics
- Disease classification
- Patient management
- Clinical interpretation
- Methodologies/technology (including limitations)

Areas of science related to haematology

Cross-over knowledge with other biomedical science disciplines, particularly transfusion science, immunology and clinical biochemistry, is expected, but not in depth. The successful candidate will demonstrate a basic knowledge of the importance of good liver, renal and gastrointestinal function to haematology.

Candidates may be expected to interpret standard routine biochemistry results but are not expected to have an in-depth knowledge of these tests, only where they impact on haematology.

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS

Bain BJ. *Blood Cells: A Practical Guide.* 5th ed. Wiley-Blackwell; 2015. ISBN-10: 1118817338

Bain BJ. Haemoglobinopathy *Diagnosis*. 2nd ed. Wiley-Blackwell; 2005. ISBN-10: 1405135166

Bain BJ, Bates I, Laffin MA. *Practical Haematology.* 12th ed. Elsevier; 2016. ISBN-10: 0702066966

Bain BJ, Wild B, Stephens A, Phelan L. *Variant Haemoglobins: A Guide to Identification.* Wiley-Blackwell; 2010. ISBN-10: 1405167157

Blann A and Ahmed N. *Blood Science: Principles and Pathology.* Wiley-Blackwell; 2014. ISBN-10: 1118351460

Erber WE. *Diagnostic Techniques in Haematological Malignancies.* Cambridge University Press; 2010. ISBN-10: 05211111218

Greer J, Arber DA, Glader BE, List AF, Means RT, Paraskevas F, Rodgers GM, Foerster J. (Eds.) *Wintrobe's Clinical Haematology*. 13th ed. Lippincott Williams and Wilkins; 2013. ISBN-10: 1451172680

Hoffbrand AV, Higgs DR, Keeling DM, Mehta AB. (Eds.) *Postgraduate Haematology*. 7th ed. Wiley- Blackwell; 2016. ISBN-10: 1118854322

Hoffbrand AV, Moss P. *Essential Haematology*. 7th ed. Wiley- Blackwell; 2015. ISBN-10: 1118408675

Hoffman R, Benz EJ, Silberstein LE, Heslop H, Weitz J, Anastasi J. *Haematology: Basic Principles and Practice*. 7th ed. Elsevier; 2017. ISBN-10: 0323357628

Howard MR, Hamilton PJ. *Haematology: An Illustrated Colour Text.* 4th ed. Churchill Livingstone; 2013. ISBN-10: 070205139X

Kitchen S, Olson JD, Preston FE. (Eds.). *Quality in Laboratory Haemostasis and Thrombosis.* 2nd ed. Wiley-Blackwell; 2013. *ISBN-10: 047067119X*

Mehta A, Hoffbrand AV. *Haematology at a Glance.* 4th ed. Wiley-Blackwell; 2014. ISBN-10: 1119969220

Moore G, Knight G, Blann A. *Haematology (Fundamentals of Biomedical Science).* 2nd ed. OUP; 2016. ISBN-10: 0199668868

Nathan DG, Orkin SH, Ginsburg D, Thomas Look A, Fisher DE, Lux S. *Nathan and Oski's Haematology of Infancy and Childhood*. 8th rev. ed. Saunders; 2014. ISBN-10: 1455754145

Pallister C, Watson M. *Haematology.* 2nd ed. Scion Publishing; 2010. ISBN-10: 1904842399

Porwit A, McCullough J, Erber WE. (Eds.) *Blood and Bone Marrow Pathology.* 2nd ed. Churchill Livingstone; 2011. ISBN-10: 070203147X

Provan D, Baglin T, Dokal I, de Vos J. *Oxford Handbook of Clinical Haematology*. 4th ed. OUP Oxford; 2015. ISBN-10: 0199683301

Provan D, Gribben J. (Eds.) *Molecular Haematology.* 3rd ed. Wiley-Blackwell; 2010. ISBN-10: 1405182318

Provan D. (Ed.) *Oxford Handbook of Clinical and Laboratory Investigation.* 3rd ed. OUP Oxford; 2010. ISBN-10: 0199233713

Roitt I, Male D, Roth D, Brostoff J. *Immunology.* 8th ed. Saunders; 2011. ISBN 0323080588

Swerdlow SH. (Ed.) *WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues.* 4th ed. WHO; 2008. ISBN-10: 9283224310

JOURNALS

American Journal of Haematology
Blood Coagulation and Fibrinolysis
British Journal of Haematology
British Medical Journal
Clinical and Laboratory Haematology
European Journal of Haematology
Journal of Biological Chemistry
Journal of Thrombosis and Haemostasis
Methods in enzymology
Platelets
Seminars in Haematology
Thrombosis and Haemostasis
Blood
Blood Reviews
British Journal of Biomedical Science
Clinics in Haematology
Department of Health Policies and Guidelines
Health Service Journal
Journal of Clinical Pathology
Lancet
New England Journal of Medicine
Proceedings of the National Academy of Science (USA)
The Biomedical Scientist
Transfusion Science

Up-to-date recommendations on textbooks, journals and websites may be found on the IBMS website: www.ibms.org

HISTOCOMPATIBILITY AND IMMUNOGENETICS

INDICATIVE SYLLABUS

An in-depth understanding of current knowledge and practice relating to:

- structure, components, function and regulation of the human immune system and its clinical significance in transplantation
- genetic inheritance, population genetics, linkage disequilibrium. The implications for anthropological studies, ethnic differences and histocompatibilty testing
- statistical analysis methods used in population genetics such as Hardy-Weinburg, Chi-squared, Fisher's cxact, Lod scores, twin studies and survival analysis
- recombination, gene frequency and chromosome mapping
- HLA system, history, nomenclature, structure, function, polymorphism and evolution of the MHC
- histocompatibility and immunogenetics assay methods and techniques, their application and limitations
- reagent selection, preparation, calibration and storage
- minor histocompatibility antigens and their significance
- other genes within the MHC
- HLA and solid organ transplantation
- factors affecting graft / patient survival
- HLA and haematopoietic stem cell (HSC) transplantation
- haematopoiesis and cell lineage
- sources of haematopoietic stem cells
- donor registries
- clinical conditions requiring solid organ and HSC transplants
- immunosuppresion in transplantation
- HLA and disease
- HLA and blood transfusion

- HPA and HNA antigen systems, their clinical significance and techniques used in antibody detection and antigen typing
- blood groups, platelet groups and basic haematology
- pathophysiology of conditions requiring solid organ and human haematopoietic stem cell transplantation
- principles and practice of key methodologies used in H&I, their advantages and limitations
- relevant legislation and guidelines associated with H&I such as BTS guidelines, EFI standards, Human Tissues Act etc.
- national protocols and policies for solid organ and haematopoietic stem cell transplantation.

Awareness of areas of knowledge/practice related to histocompatibility and immunogenetics

- Blood cell counts and normal ranges
- Blood groups and their significance in transplantation and transfusion
- Blood and blood component therapies
- Haematological malignancy diagnosis and therapies
- Haematopoietic stem cell mobilisation.

Awareness of research and developing practice

- Genetically modified tissues
- Embryonic stem cells
- Stem cell plasticity
- Therapeutic cloning in transplantation
- Induction of tolerance

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS

Contreras M. *ABC of Transfusion*. 4th ed. Wiley-Blackwell, 2008. ISBN-10: 1405156465

Danovitch GM. *Handbook of Kidney Transplantation* 5th ed. Lippincott Williams and Wilkins, 2009. ISBN-10: 0781793742

Hubbard JD. Co*ncise Review of Clinical Laboratory Science*. Lippincott Williams & Wilkins, 2009. ISBN-10: 0781782023

Klein AA, Lewis CJ, Madsen JC. *Organ Transplantation: A Clinical Guide.* Cambridge University Press, 2011. ISBN-10: 0521197538

Murphy K. *Janeway's Immunobiology*. 8th ed. Garland Science, 2011. ISBN-10: 0815342438

Murphy M, Roberts D, Yazer M. (Eds). *Practical Transfusion Medicine.* 5th ed. Wiley-Blackwell; 2017. ISBN-10: 1119129419

Neuberger J, Ferguson J, Newsome PN. (Eds.) *Liver Transplantation: Clinical Assessment and Management*. Wiley-Blackwell, 2013. ISBN-10: 1118277384

Norfolk D. (Ed.) *Handbook of Transfusion Medicine.* 5th ed. The Stationery Office Books; 2013. ISBN-10: 0117068462

Owen J, Punt J, Stranford S. *Kuby Immunology*. 7th edn. WH Freeman, 2013. ISBN-10: 1464137846

Tilney NL. *Transplantation: From Myth to Reality*. 1st edn. Yale University Press, 2003. ISBN-10: 0300099630

JOURNALS

Blood
Bone Marrow Transplantation
Clinical Transplantation
International Journal of Immunogenetics
Immunological Reviews
Lancet
Nature
Nature Medicine
The Biomedical Scientist
Tissue Antigens
Transfusion
Transplantation

Transplantation Immunology
Transplantation Reviews
Transplantation Proceedings
Vox Sanguins

WEBSITES

Up-to-date recommendations on textbooks, journals and websites may be found on the IBMS website: www.ibms.org

IMMUNOLOGY

INDICATIVE SYLLABUS

An in depth understanding of current Immunology knowledge and practice relating to:

- Manual and automated immunology techniques / technologies
- Application of IT systems in immunology
- Quality management systems
- Laboratory & Clinical audit
- Accreditation standards and legislation
- National and international standards/guidelines
- Analytical values, detection limits, method ranges, method interference
- Reference ranges (age/sex)
- Specificity/sensitivity criteria
- Recognition of error
- Reflex testing & Request management.

Awareness of research and developing practice:

- Molecular genotyping and other emerging technologies
- Luminex / bead-based technology
- Biological Therapies

Awareness of areas of knowledge / practice related to Immunology:

The basis of specific immunity:

- Immunogens, antigens and epitopes
- Types and structures of antigens, antigen processing and presentation
- Immunoglobulins (structure, function and antigen binding)
- Immunogenetics (polymorphisms, generation of diversity)
- Major histocompatibility complex (structure, function and regulation)
- T and B cell receptors (structure, function, diversity and the nature of antigen binding)
- T- and B-lymphocytes: ontogeny, phenotype, sub-populations, receptor/ligand interactions and cell activation. Effector functions.

Immunopathology with reference to:

- Disease classification
- Patient management
- Clinical interpretation

Immunochemistry:

- Paraproteins
- Complement
- Complement deficiencies,
- The acute phase response and inflammation

Autoimmunity:

- Antinuclear and related antibodies
- Gastrointestinal disorders
- Liver disease
- Renal disease
- Neurological disease
- Endocrine disease
- Dermatological disease

Immunodeficiency:

- Primary immune deficiency (Cellular & Antibody)
- Secondary immunodeficiency
- Cytokine deficiencies
- Complement deficiencies

Allergy & Hypersensitivity:

- Pathophysiology of type I hypersensitivity reactions: asthma, rhinitis, atopic dermatitis, anaphylaxis
- Skin prick testing / in vitro testing in the investigation of allergic disease
- Immune complex mediated hypersensitivity
- Delayed-type hypersensitivity.
- Allergy & Anti-IgE Immunotherapy

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS:

Abbas A, Litchtman A, Pillai S. *Cellular and Molecular Immunology.* 9th ed. Elseveir; 2017. ISBN-10: 0323479782

Cruse JM, Lewis RE. *Illustrated Dictionary of Immunology.* 3rd ed. CRC Press; 2008. ISBN-10: 0849379873

Dorrestyn Stevens C, Miller L., *Clinical Immunology and Serology A Laboratory Perspective.* 4th ed. F.A. Davis Company; 2016. ISBN-10: 0803644663

Geha R, Notarangelo L. *Case Studies in Immunology – A Clinical Companion.* 7th ed. Garland Science; 2016. ISBN-10: 0815345127

Haeney M, Misbah S, Snowden N, Chapel H. *Essentials of Clinical Immunology.* 6th ed. Wiley-Blackwell; 2014. ISBN-10: 1118472950

Hall A, Yates C. *Immunology (Fundamental of Biomedical Science).* 2nd ed. OUP Oxford; 2016. ISBN-10: 0199657653

Hannigan BM, Moore CBT, Quinn DG. *Immunology.* 2nd ed. Scion Publishing; 2009. ISBN-10: 8130906031

Hay F, Westwood O. *Practical Immunology.* 4th ed**.** Wiley-Blackwell; 2009. ISBN-10: 0865429618

Janeway CA, Travers P, Walport M, Schlomchik M. *Immunobiology: The Immune System in Health and Disease.* 6th ed. Churchill Livingstone; 2004. ISBN-10: 0443073104

Nairn R, Helbert M. *Immunology for Medical Students.* 2nd ed. Mosby; 2007**.** ISBN-10: 0323043313

Ochs HD, Edvard Smith CI, Puck JM. *Primary Immunodeficiency Diseases: A Molecular and Genetic Approach.* 3rd ed. OUP USA; 2013. ISBN-10: 0195389832

Peakman M, Vergani D. (Eds.) *Basic and Clinical Immunology*. 2nd ed**.** Churchill Livingstone; 2009. ISBN-10: 0443100829

Rich RR, Fleisher TA, Shearer WT, Schroeder H, Frew AJ, Weyand CM. *Clinical Immunology: Principles and Practice*. 4th ed. Mosby; 2012. ISBN-10: 0723436916

Roitt I, Male D, Roth D, Brostoff J. *Immunology.* 8th ed. Saunders; 2011. ISBN 0323080588

Roitt I, Delves PJ, Martin SJ, Burton DR. *Roitt's Essential Immunology*. 13th ed. Wiley-Blackwell; 2017. ISBN-10: 1118415779

Rose NR, Mackay IR. (Eds.) *The Autoimmune Diseases*. 5th ed. Academic Press Inc.; 2013. ISBN-10: 0123849292

Sompayrac LM. *How the Immune System Works.* 5thed. Wiley-Blackwell; 2015. ISBN-10: 1118997778

Spickett G. *Oxford Handbook of Clinical Immunology and Allergy.* 3rd ed. Oxford University Press; 2013. ISBN-10: 0199603243

JOURNALS

Annals of Rheumatological Disease (BMJ)
Clinical and Experimental Allergy (BSACI)
Clinical and Experimental Immunology (BSI)
Current Opinion in Immunology
Current Opinion in Allergy and Clinical Immunology
Journal of Allergy & Clinical Immunology (JACI)
Journal of Clinical Pathology
Immunology (BSI)
Lancet
The Biomedical Scientist

WEBSITES

Primary Immunodeficiency Network	www.ukpin.org.uk
UK NEQAS Interpretive Scheme	www.immqas.org.uk
British Society for Allergy and Clinical Immunology	www.bsaci.org
British Society of Immunology	www.immunology.org
American Association of Immunologists	www.aai.org
Primary Immunodeficiency Organisation	www.pia.org.uk
European Society of Immunodeficiency	www.esid.org
Essentials of Clinical Immunology	www.immunologyclinic.com
European Academy of Allergy & Clinical Immunology	www.eacci.net

Up-to-date recommendations on textbooks, journals and websites may be found on the IBMS website: www.ibms.org

MEDICAL MICROBIOLOGY

INDICATIVE SYLLABUS

An in-depth understating of current knowledge and practice relating to:

- medically important bacteria, fungi, parasites and viruses
- infections of the systems of the body, to include common causes, pathogenic mechanisms, current diagnostic techniques, treatment strategies, antimicrobial resistance patterns etc.
    - Genitourinary tract infections
    - Central nervous system infections
    - Gastrointestinal infections
    - Respiratory tract infections
    - Skin, bone, joint and soft tissue infections
    - Systemic infections.
- disease classification
- patient management
- clinical interpretation
- isolation and identification techniques
- non-cultural detection methods
- molecular diagnosis
- epidemiology
- infection control
- microscopy (operation and application)
- susceptibility testing
- serological diagnosis

Awareness of research and developing practice

- Evolving and emerging techniques

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS

Bennett JE, Dolin R, Blaser M. *Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases.* 8th ed. Saunders; 2014. ISBN-10: 1455748013

Carroll KC, Miller S, Morse SA, Mietzner T. *Jawetz, Melnick and Adelberg's Medical Microbiology.* 27th ed. McGraw-Hill Medical; 2015. ISBN-10: 0071824987

Davey P, Wilcox MH, Irving W, Thwaites G. *Antimicrobial Chemotherapy*. 7th ed. OUP, Oxford; 2015. ISBN-10: 0199689776

Gillespie G, Bamford K. *Medical Microbiology at a Glance.* 4th ed. Wiley-Blackwell; 2012. ISBN-10: 0470655712

Ford M. (Ed) *Medical Microbiology (Fundamentals of Biomedical Science).* 2nd ed. *OUP, Oxford; 2014. ISBN-10: 0199655138*

Goering RV, Dockrell HM, Zuckerman M, Roitt I, Chiodini PL. *Mims' Medical Microbiology*. 5th ed. Saunders; 2012. ISBN-10: 0723436010

Greenwood D, Slack RCB, Barer MR, Irving WL. (Eds.). *Medical Microbiology*. 18th ed. Churchill Livingstone; 2012. ISBN-10: 0702040894

Madigan M, Bender K, Buckley D, Sattley M, Stahl DA. *Brock Biology of Microorganisms.* 15th ed. Pearson Education; 2017. ISBN-10: 0134261925

Murray PR, Rosenthal KS, Pfaller MA. Medical Microbiology. 8th ed. Elsevier; 2015. ISBN-10: 0323299563

Nash A, Daliziel R, Stephen J. *Mims' Pathogenesis of Infectious Disease.* 6th ed. Academic Press; 2015. ISBN-10: 0123971888

Torok E, Moran E, Cooke F. *Oxford Handbook of Infectious Diseases and Microbiology.* 2nd ed. OUP Oxford; 2016. ISBN-10: 019967132X

JOURNALS

Antimicrobial Agents and Chemotherapeutic Agents
Clinical Microbiology and Infection *Clinical Microbiology Reviews*
Diagnostic Microbiology and Infectious Disease
European Journal of Clinical Microbiology and Infection
FEMS Microbiology Reviews *Health Service Journal*
International Journal of Medical Microbiology
Journal of Applied Microbiology *Journal of Bacteriology*

Journal of Biomedical Sciences
Journal of Clinical Microbiology
Journal of Hospital Infection
Journal of Infection
Journal of Medical Microbiology
Journal of Parasitology
Lancet
Molecular Microbiology
Mycoses
The Biomedical Scientist

WEBSITES

Department of Health	www.doh.gov.uk
Health Protection Agency	www.hpa.org.uk
Euro surveillance	www.eurosurveillance.org
Centers for Disease Control and Prevention	www.cdc.gov/
World Health Organisation	www.who.int/en/

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TRANSFUSION SCIENCE

INDICATIVE SYLLABUS

An in-depth understanding of current knowledge and practice relating to:

- blood group systems, genes, antigens, antibodies and their clinical significance
- immunological basis of antibody-mediated red cell and platelet destruction
- manual and automated immunohaematology techniques / technologies
- application of IT systems in transfusion medicine
- quality management systems
- BCSH guidelines and UK guidelines for transfusion services
- accreditation standards and legislation relevant to transfusion medicine
- specifications for immunohaematology reagents
- pretransfusion patient testing and procedures
- patient and donor red cell testing anomalies
- antenatal testing and management of HDN
- Anti-D prophylaxis and measurement of FMH
- investigation and treatment of red cell-related autoimmune diseases
- transfusion therapy in the management of acute and chronic conditions
- appropriate use of blood and blood components
- selection and issue of blood and blood components
- investigation, reporting and management of adverse transfusion reactions / outcomes
- multidisciplinary teams and the hospital transfusion committee
- hospital blood stock management and traceability
- maintenance of a safe and sufficient blood supply
- ethics of donor selection, motivation and care
- blood component preparation

- transfusion-transmitted infections
- donation testing
- transport and storage of blood components and products.

Awareness of areas of knowledge / practice related to transfusion medicine

- HLA, HPA and neutrophil antigens / antibodies
- Red cell membrane structure and function
- Bone marrow and stem cell transplant
- Current alternatives to allogeneic blood
- Normal ranges and predictive value of pathology tests used to inform transfusion support
- Aetiology and clinical features of conditions requiring transfusion support.

Awareness of research and developing practice in:

- Molecular genotyping and other emerging technologies
- Potential blood substitutes
- 'Vein to vein' IT solutions.

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS

Contreras M. *ABC of Transfusion*. 4th ed. Wiley-Blackwell, 2008. ISBN-10: 1405156465

Daniels G. *Human Blood Groups.* 3rd ed. Wiley-Blackwell; 2013. ISBN-10: 1444333240

Daniels G, Bromilow I. *Essential Guide to Blood Groups*. 3rd ed. Wiley-Blackwell, 2013. ISBN-10: 1118688929.

Hadley A, Soothill P. (Eds.) *Allo-immune disorders of preganancy, anaemia, thrombocytopenia and neutropenia in the fetus and newborn* Cambridge University Press, 2002. ISBN-10: 0521018048

Hillyer C, Silberstein LE, Ness P, Anderson K, Roback J. *Blood Banking and Transfusion Medicine: Basic Principles and Practice.* 2nd ed. Churchill Livingtsone, 2006. ISBN-10: 0443069816

Hoffbrand AV, Moss P. *Essential Haematology*. 7th ed. Wiley- Blackwell; 2015. ISBN-10: 1118408675

Joint UKBTS and HPA Professional Advisory Committee. *Guidelines for the Blood Transfusion Services in the United Kingdom* 2013. 8th ed. Stationery Office, 2013. ISBN-10: 0117081761

Klein HG, Anstee DJ. (Eds.) *Blood Transfusions in Clinical Medicine*. 12th ed. Wiley-Blackwell; 2014. ISBN-10: 1405199407

Knight R. (Ed.) *Transfusion and Transplantation Science (Fundamentals of Biomedical Science).* OUP Oxford; 2012. ISBN-10: 0199533288

McCullough J. *Transfusion Medicine*. 4th ed. Wiley-Blackwell, 2016. ISBN-10: 1119236541

Medicines and Healthcare products Regulatory Agency*. Rules and Guidance for Pharmaceutical Manufacturers and Distributors 2017 (Orange Guide)*. Pharmaceutical Press, 2017. ISBN-10: 0857112856

Mijovic A. *Transfusion Medicine: Case Studies and Clinical Management.* Springer, 2012. ISBN-10: 1447121813

Murphy M, Roberts D, Yazer M. (Eds). *Practical Transfusion Medicine.* 5th ed. Wiley-Blackwell; 2017. ISBN-10: 1119129419

Norfolk D. (Ed.) *Handbook of Transfusion Medicine.* 5th ed. The Stationery Office Books; 2013. ISBN-10: 0117068462

Reid M, Lomas-Francis C, Olsson ML. *The Blood Group Antigen Facts Book.* 3rd ed. Academic Press; 2012. ISBN-10: 0124158498

Roitt I, Delves PJ, Martin SJ, Burton DR. *Roitt's Essential Immunology***.** 13th ed. Wiley-Blackwell; 2017. ISBN-10: 1118415779

Seeber P, Shander A. *Basics of Blood Management*. 2nd ed. Wiley-Blackwell; 2012. ISBN-10: 0470670703

Shaz BH, Hillyer CD, Roshal M, Abrams CS. *Transfusion Medicine and Haemostasis.* 2nd ed. Elsevier Science; 2013. ISBN-10: 0123971640

Simon T *et al*. (Ed.) *Rossi's Principles of Transfusion Medicine.* 5th ed. Wiley-Blackwell 2016. ISBN-10:1119012996

Thomas D, Thompson J, Ridler B. (Eds.) *All Blood Counts: A Manual for Blood Conservation and Patient Blood Management.* Tfm Publishing; 2016. ISBN-10: 1903378958

JOURNALS

Blood	British Journal of Biomedical Science
Health Service Journal	The Biomedical Scientist
Transfusion	Transfusion Medicine
Transfusion Medicine Reviews	Vax Sanguinis

WEBSITES

BCSH Guidelines	www.bcshguidelines.com
UK Transfusion Services Guidelines	www.transfusionguidelines.org.uk
National Institute of Clinical Excellence (NICE)	www.nice.org.uk
Department of Health	www.doh.gov.uk
National Blood Service	www.blood.org.uk/hospitals
Blood Stocks Management Scheme	www.bloodnet.nbs.nhs.uk/bsms
Network for Advancement of Transfusion Alternatives	www.nata-edu.org

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VIROLOGY

INDICATIVE SYLLABUS

An in depth understanding of current knowledge and practice relating to:

- virus families and disease groups including:
  - bloodborne viruses
  - respiratory infections including fastidious bacteria
  - neurological disease
  - gastroenteritis and enterically transmitted viruses
  - viral exanthems and systemic illness
  - sexually transmitted diseases including syphilis and chlamydial infections
  - ocular disease
  - infections in the immunocompromised
  - diseases of childhood and the young, perinatal, congenital and neonatal infection
  - emerging and spreading viruses, haemorrhagic fevers and exotic viruses
  - viruses and cancer.
- laboratory diagnosis and diagnostic methods including:
  - diagnostic methods and principles
  - automation and manual methods
  - quality assurance and quality control
  - asymptomatic screening (antenatal, occupational health)
  - national guidelines and SOPs
  - accreditation standards and legislation relevant to diagnostic virology
  - evaluation and introduction of new diagnostic methods, reagents and kits
  - point-of-care testing.
- use of appropriate test methods and interpretation of results including:
  - recognition of inappropriate and discrepant results

- use of antivirals and viral load monitoring.
- Recommendation of appropriate samples
- Management of disease contacts and outbreaks

Awareness of research and developing practice including:

- newly discovered viruses
- novel diagnostic methods
- changing best practice.

RECOMMENDED READING

This is not an exhaustive or mandatory reading list but the following books are recommended for this discipline. Candidates are also encouraged to expand their knowledge and understanding on the subject through further reading. In addition this list is correct at the date of publication of this study guide but candidates are advised that if a newer addition of a list book is available then that should be used.

BOOKS

Acheson NH. *Fundamentals of Molecular Virology*. 2nd ed. John Wiley & Sons Ltd; 2011. ISBN-10: 0470900598

Cann A. *Principles of Molecular Virology.* 6th ed. Academic Press; 2015. ISBN-10: 0128019468

Carter J, Saunders V. *Virology: Principles and Applications*. 2nd ed. John Wiley & Sons Limited; 2013. ISBN-10: 111999120

Flint SJ, Enquist L, Racaniello V, Rall GF, Skalka AM. *Principles of Virology.* 4th ed. ASM Press; 2015. ISBN-10: 1555819338

Knipe DM, Howley PM (Eds. in chief). *Fields Virology.* 6th ed. Lippincott: Williams and Wilkins; 2013. ISBN-10: 1451105630

Korsman S, Van Zyl G, Nutt L, Anderson MI, Preiser W. *Virology: An Illustrated Colour Text*. Churchill Livingstone; 2012. ISBN-10: 0443073678

Mahy BWJ, Van Regenmortel MHV (Eds.). *Desk Encyclopedia of Human and Medical Virology*. Academic Press; 2009. ISBN-10: 0123751470

Oxford J, Kellam P, Collier L. *Human Virology*. 5th ed. OUP; 2016. ISBN-10:0198714688

Richman DD, Whitley RJ, Hayden FG. (Eds.). *Clinical Virology.* 4th ed. American Society for Microbiology Press; 2017. ISBN-10: 1555819427

Tille PM. *Bailey & Scott's Diagnostic Microbiology.* 14thed. Mosby: 2017. ISBN-10: 0323354823

Zuckerman AJ, Banatvala JE, Griffiths P, Schoub B, Mortimer P (Eds.). *Principles and Practice of Clinical Virology.* 6th edn. Wiley Blackwell; 2009. ISBN-10: 0470517999

JOURNALS

AIDS
British Journal of Biomedical Science
Journal of Infection
Microbes and Infection
Reviews in Medical Virology
Vaccine
British Medical Journal
Journal of Clinical Virology
Lancet
New England Journal of Medicine
The Biomedical Scientist

WEBSITES

CDC-Emerging Infectious Disease Journal online	www.cdc.gov
Clinical Pathology Accreditation	www.cpa-uk.co.uk
CVN	www.clinical-virology.org
Eurosurveillance	www.eurosurveillance.org
Health Protection Agency	www.phls.org
Medscape World Health Organisation	www.medscape.com

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APPENDICES

Appendix A - Record of CPD Activities and Reflective Practice

RECORD OF CPD ACTIVITIES AND REFELECTIVE PRACTICE

Name:

Membership Number:

1. List the CPD activities you have undertaken relevant to your preparation for the Higher Specialist Diploma examination:
Please continue on a separate sheet if necessary

2. Provide three statements of 1000 words each (± 10%) to explain how your CPD activities, case studies, essays and oral presentation meet the following learning outcomes related to knowledge and understanding, professional skills and transferrable skills:

- Deal with complex issues systematically and creatively , and communicate findings to specialists and other professional groups
- Demonstrate self-direction and originality in problem-solving across a variety of areas
- Continue to advance knowledge and understanding, to develop new skills to a high level and possess the necessary qualities and transferrable skills at an advanced professional level

The reflective statement s must be supported by reference to selected samples of evidence from your HSD portfolio

Please continue on a separate sheet if necessary

Examples of CPD activities

1. Professional activities

- Tutor, lecturer, mentor, researcher (academia-based)
- Course planning or running
- Supervision of training or research
- Local or national assessor
- Professional appointments (e.g. IBMS, NQAAP, CPA, HPC)
- Assessor or examiner (university, professional both or other organisation)
- Publications (book or journal)
- Setting CPD activities (JBL, structured reading essays etc…)
- Presentation of papers or posters
- Attending conferences
- Expert witness

2. Work-based and self-directed learning

- Discussion groups, journal clubs
- Instrument training
- On-line courses etc…
- JBL activities
- Case-study meetings (attendance and presentation)
- Work-based tutor, training officer or project supervisor
- Organiser of CPD or training meetings
- Local reviews or audits
- Involvement in PDPs or appraisals
- Analysing day-to-day events or practices
- Rotational or secondment training

3. Educational

- Courses and seminars
- Higher qualifications
- Distance learning

Tips for reflective statements

- Be concise and make every word count
- Structure your statement and avoid random thoughts
- Ensure there is logical progression throughout the statement
- Ensure the content is accurate and factual, especially when referring to selected CPD activities

Appendix B – HSD Portfolio Assessment Indicators

The portfolio of experiential learning which forms Part A of the Higher Specialist Diploma is assessed against the following assessment indicators.

Personal Professional Profile

1. The profile is of the appropriate length (500 words, ±10%)

CPD Activities

2. A mix of activities relevant to candidate's preparation for the HSD

3. It is evident that the candidate has dealt with complex issues systematically & creatively, and communicated findings to specialists and other professional groups

4. The candidate demonstrates self-direction and originality in problem-solving across a variety of areas

5. Activities demonstrate that the candidate advanced their knowledge and understanding, developed new skills and possesses the necessary qualities & transferable skills (leadership & communication)

Case Studies

6. Case Studies are neat, well laid out and are of appropriate length (1000 words, ±10%) and relate to clinical or management issues

7. Case studies follow the correct format as outlined in the study guide

<u>Clinical cases</u>
Pre-analysis, analysis, post-analysis

<u>Management cases</u>
Issue, investigations, action taken, outcomes and any follow-up

8. Illustrations or images when used are relevant and of high quality

9. Demonstration of self-direction in solving problems and exercising a high degree of personal autonomy in relation to scope of practice

10. Demonstration of systematic application of professional knowledge and understanding in interpretation of complex data to determine action based on best practice

Essays

11. Essays are 3000 words each, ±10%

12. Essays are referenced in Vancouver style

13. There is no evidence of plagiarism

14. Essays demonstrate a comprehensive understanding of highly complex scientific technical & managerial aspects of the relevant field of biomedical science

15. There is evidence of critical awareness of current issues and developments within healthcare and biomedical science

Oral Presentation

16. It is evident that the candidate has introduced the subject, dealt systematically with the issues and communicated the conclusions to the audience

General Overview

17. The portfolio is presented to a professional standard

18. There is evidence of appropriate reflection (what has been learned from undertaking the activities required for the HSD portfolio) through the submission of three reflective statements. Each statement is focussed on a separate HSD learning outcome

Appendix C

Higher Specialist Diploma marking guidelines for examinations

Mark %	Grade (Masters level)	Description
90-100	**Distinction**	An answer with a clear and appropriate structure, showing very detailed understanding and critical analysis of the issues. Using suitable evidence, both the scientific and professional aspects of the topic are explored in depth. Critical discussion is deep and detailed throughout. The answer may provide an unusually insightful or even novel conclusion. Answer fully focussed on discipline specific science, technical details and / or service delivery issues – as appropriate to the question. Candidate demonstrates depth and breadth of knowledge, showing an awareness of policy, usual practice and current and future trends in this topic across pathology. This would include reflection on their department's practice and comparison with national and even international developments where appropriate.
80-89	**Distinction**	An answer with a clear and appropriate structure, showing detailed understanding and critical analysis of the issues. Using suitable evidence, both the scientific and professional aspects of the topic are explored in some depth. Attempt at critical discussion is evident, although some possible observations or insights missed or not followed through completely. Answer clearly focussed on discipline specific science, technical details and / or service delivery issues - as appropriate to the question. Candidate demonstrates good knowledge of policy, usual practice and current trends in this topic across pathology and is able to bring them into discussion and to make suitable use of reflection their own department's practice where appropriate.
70-79	**Distinction**	An answer with a clear and appropriate structure, showing understanding and critical analysis of the issues. Using suitable evidence, both the scientific and professional aspects of the topic are explored. Clear attempt at critical discussion is evident, though in places may be limited in depth or detail. Some opportunities to provide interesting conclusions or further observations missed. Answer mainly focussed on discipline specific science, technical details and / or service delivery issues - as appropriate to the question, but some details missing. Candidate demonstrates awareness of policy, usual practice and current trends in this topic across pathology and is able to use them to make comparisons with their own department's practice where appropriate.
60-69	**Merit**	An answer which is well structured and shows understanding and analysis of the issues. Both the scientific and professional aspects of the topic are explored, with some evidence but lacking depth in some points. Some attempt at critical discussion has been made. Conclusions or further observations provided, with

		some discussion, but limited in scope. Answer focussed on discipline specific science, technical details and / or service delivery issues - as appropriate to the question, but some details missing. Candidate demonstrates good awareness of policy, usual practice and current trends in this topic across pathology, but omits some pertinent details. There is some discussion about their department's practice.
50-59	**Pass**	An answer which is well structured and shows some understanding and analysis of the issues. Both the scientific and professional aspects of the topic are explored, but lacking in required depth. Some attempt at critical discussion has been made but to a limited extent. Some conclusions or further observations provided but lacks adequate discussion, and limited in scope. Answer focussed on discipline specific science, technical details and / or service delivery issues - as appropriate to the question, but missing detail and some irrelevant points made. Candidate demonstrates satisfactory awareness of policy, usual practice and current trends in this topic across pathology, but omits some pertinent details. There is limited discussion about their department's practice.
40-49	**Pass**	An answer which contains some of the main points is quite well structured and shows some limited understanding of the issues. An attempt is made to explore the topic, but several points of either the scientific or professional (or both) aspects are missed. Limited discussion provided, generally lacking in depth, detail and critical analysis. If conclusion is given, it is a summary of the main text, rather than drawing insights or observations from the information provided in the answer. Answer generally addresses the question, but either omits key details, or strays in focus to provide irrelevant points. Candidates demonstrate some knowledge awareness of policy and trends in this topic across pathology, but tends to stay focussed on their own department's practice, with limited awareness of how this compares with that of other laboratories.
35-39	**Fail**	An answer which contains some of the main points, but misses out some important ones. It is not well structured and lacks depth and detail. A limited attempt is made to address the topic but many obvious relevant points are missed with respect to the scientific and/or the professional aspects. Answer not focussed appropriately on the question through lack of detail or through providing irrelevant information. The meaning of the question has not been fully understood. Candidate does not show any knowledge of policies or usual practice or trends in this area.
30-35	**Fail**	An answer which does include a few points relevant to the question but lacks detail, and is not focussed on the question. It is not well structured and most pertinent points have been missed out. The meaning of the question has not been understood at all. Any mention of policies or usual practice or trends in this area is incorrect or irrelevant and/ or shows poor knowledge and understanding.
20-29	**Fail**	An answer which does not address the question. Several relevant points may be made in passing, but there is no structure or detail and very little which pertains to the focus of the question. Candidate does not show any knowledge of policies or usual practice or trends in this area.
10-19	**Fail**	An answer which is does not address the question. One or two relevant points may be made in passing, but there is no structure or detail and very little which pertains to the focus of the question. Candidate does not show any knowledge of policies or usual practice or trends in this area.
0-9	**Fail**	An answer which does not seriously address the question.