

Pearson BTEC Level 4 Certificate in Optical Dispensing

BTEC Professional qualifications

Specification

First teaching August 2014

Issue 2

Edexcel, BTEC and LCCI qualifications

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This specification is Issue 2. Key changes are listed in the summary table on the next page. We will inform centres of any changes to this issue. The latest issue can be found on the Pearson website: qualifications.pearson.com.

This qualification was previously known as:

Pearson BTEC Level 4 Certificate in Optical Dispensing (QCF)

The QN remains the same.

References to third-party material made in this specification are made in good faith. We do not endorse, approve or accept responsibility for the content of materials, which may be subject to change, or any opinions expressed therein. (Material may include textbooks, journals, magazines and other publications and websites.)

All information in this specification is correct at time of publication.

ISBN: 978 1 446 94036 5

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Summary of Pearson BTEC Level 4 Certificate in Optical Dispensing specification Issue 2 changes

Summary of changes made between previous issue and this current issue	Page number
All references to QCF have been removed throughout the specification	
Definition of TQT added	1
Definition of sizes of qualifications aligned to TQT	1
Credit value range removed and replaced with lowest credit value for the shortest route through the qualification	3
TQT value added	3
GLH range removed and replaced with lowest GLH value for the shortest route through the qualification	3
QCF references removed from unit titles and unit levels in all units	13 - 47
Guided learning definition updated	1

Earlier issue(s) show(s) previous changes.

If you need further information on these changes or what they mean, contact us via our website at: qualifications.pearson.com/en/support/contact-us.html.

Pearson BTEC Professional qualification title covered by this specification

Pearson BTEC Level 4 Certificate in Optical Dispensing

Qualifications eligible and funded for post-16-year-olds can be found on the funding Hub. The Skills Funding Agency also publishes a funding catalogue that lists the qualifications available for 19+ funding.

The Qualification Number (QN) should be used by centres when they wish to seek public funding for their learners. Each unit within a qualification will also have a unit code.

The qualification and unit codes will appear on learners' final certification documentation.

The Qualification Number for the qualification in this publication is: 601/1841/6

This qualification title will appear on learners' certificates. Learners need to be made aware of this when they are recruited by the centre and registered with Pearson.

This qualification is accredited by Ofqual as being Stand Alone.

Welcome to the Pearson BTEC Level 4 Certificate in Optical Dispensing

Focusing on the Pearson BTEC Level 4 Certificate in Optical Dispensing

The Pearson BTEC Level 4 Certificate in Optical Dispensing provides the knowledge, understanding and skills needed by an optical dispenser in practice.

Straightforward to implement, teach and assess

Implementing BTECs couldn't be easier. They are designed to easily fit into your curriculum and can be studied independently or alongside existing qualifications, to suit the interests and aspirations of learners. The clarity of assessment makes grading learner attainment simpler.

Engaging for everyone

Learners of all abilities flourish when they can apply their knowledge, skills and enthusiasm to a subject. BTEC qualifications make explicit the link between theoretical learning and the world of work by giving learners the opportunity to apply their research, skills and knowledge to work-related contexts and case studies. These applied and practical BTEC approaches give all learners the impetus they need to achieve and the skills they require for workplace or education progression.

Recognition

BTECs are understood and recognised by a large number of organisations in a wide range of sectors. BTEC qualifications are developed with key industry representatives and Sector Skills Councils (SSC), in this case Skills for Health, to ensure that they meet employer and learner needs. Many industry and professional bodies offer successful BTEC learners exemptions from their accredited qualifications.

Unit mapping

Pearson BTEC Level 4 Certificate in Optical Dispensing is a new version of the Pearson EDI Level 4 Certificate in Optical Dispensing and an overview map of units between the old and new qualifications can be found in *Annexe D*.

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What are BTEC Level 4 Professional qualifications?

BTEC Professional qualifications are qualifications at Levels 4 to 8 that are designed to provide professional work-related qualifications in a range of sectors. They give learners the knowledge, understanding and skills they need to prepare for employment. The qualifications also provide career development opportunities for those already in work. Consequently, they provide a course of study for full-time or part-time learners in schools, colleges and training centres.

BTEC Professional qualifications provide much of the underpinning knowledge and understanding for the National Occupational Standards for the sector, where these are appropriate. They are supported by the relevant Standards Setting Body (SSB) or Sector Skills Council (SSC). A number of BTEC Professional qualifications are recognised as the knowledge components of Apprenticeships Frameworks.

On successful completion of a BTEC Professional qualification, learners can progress to or within employment and/or continue their study in the same, or related, vocational area.

Total Qualification Time (TQT)

For all regulated qualifications, Pearson specifies a total number of hours that it is estimated learners will require to complete and show achievement for the qualification – this is the Total Qualification Time (TQT). The TQT value indicates the size of a qualification.

Within the TQT, Pearson identifies the number of Guided Learning Hours (GLH) that we estimate a centre delivering the qualification might provide. Guided learning means activities, such as lessons, tutorials, online instruction, supervised study and giving feedback on performance, that directly involve tutors and assessors in teaching, supervising and invigilating learners. Guided learning includes the time required for learners to complete external assessment under examination or supervised conditions.

In addition to guided learning, other required learning directed by tutors or assessors will include private study, preparation for assessment and undertaking assessment when not under supervision, such as preparatory reading, revision and independent research.

TQT is assigned after consultation with employers and training providers delivering the qualifications.

BTEC Professional qualifications are generally available in the following sizes:

- Award – a qualification with a TQT value of 120 or less
- Certificate – a qualification with a TQT value in the range of 121–369
- Diploma – a qualification with a TQT value of 370 or more

Pearson BTEC Level 4 Certificate

The Pearson BTEC Level 4 Certificate offers an engaging programme for those who are clear about the vocational area they want to learn more about. These learners may wish to extend their programme through the study of a related GCSE, a complementary NVQ or other related vocational or personal and social development qualification. These learning programmes can be developed to allow learners to study complementary qualifications without duplication of content.

For adult learners the Pearson BTEC Level 4 Certificate can extend their knowledge and understanding of work in a particular sector. It is a suitable qualification for those wishing to change career or move into a particular area of employment following a career break.

Key features of the Pearson BTEC Level 4 Certificate in Optical Dispensing

The Pearson BTEC Level 4 Certificate in Optical Dispensing has been developed to give learners the opportunity to:

- engage in learning that is relevant to them and that gives them opportunities to develop a range of skills and techniques, including personal skills and attributes, essential for successful performance in working life
- achieve a nationally recognised Level 4 vocationally-related qualification
- progress to employment in a particular vocational sector
- progress to related general and/or vocational qualifications.

National Occupational Standards

Where relevant, Pearson BTEC Level 4 qualifications are designed to provide some of the underpinning knowledge and understanding for National Occupational Standards (NOS), as well as developing practical skills in preparation for work and possible achievement of NVQs in due course.

NOS form the basis of National Vocational Qualifications (NVQs). Pearson BTEC Level 4 qualifications do not purport to deliver occupational competence in the sector, which should be demonstrated in a work context.

Rules of combination

The rules of combination specify the credits that need to be achieved, through the completion of particular units, for the qualification to be awarded. All accredited qualifications within the have rules of combination.

Rules of combination for Pearson BTEC Level 4 qualifications

When combining units for the Pearson BTEC Level 4 in Optical Dispensing it is the centre's responsibility to ensure that the following rules of combination are adhered to.

Pearson BTEC Level 4 Certificate in Optical Dispensing

- 1 Qualification credit value: a minimum of 30 credits. TQT 300.
- 2 Minimum credit to be achieved at, or above, the level of the qualification: 22 credits.
- 3 All credits must be achieved from the units listed in this specification.

Pearson BTEC Level 4 Certificate in Optical Dispensing

The Pearson BTEC Level 4 Certificate in Optical Dispensing is a 30-credit and 262-guided-learning-hour (GLH) qualification that consists of 9 mandatory units.

Pearson BTEC Level 4 Certificate in Optical Dispensing				
Unit	Mandatory units	Credit	Level	GLH
1	Principles of Geometric Optics	4	4	35
2	Applied Optics of Spherical Lenses	5	4	40
3	Applied Optics of Prisms	4	4	35
4	Dispensing Astigmatic Lenses	4	4	30
5	Lens Thickness and Dispensing	2	4	17
6	Spectacle Magnification and Field of View in Dispensing	2	3	19
7	Multifocal and Progressive Lenses	4	3	37
8	Lens Design and Ametropia	3	4	30
9	Principles of Light Applied to Optics	2	2	19

Assessment

All units within this qualification are internally assessed. The qualification is criterion referenced, based on the achievement of all the specified learning outcomes.

To achieve a 'pass' a learner must have successfully passed all the assessment criteria.

Guidance

The purpose of assessment is to ensure that effective learning has taken place to give learners the opportunity to:

- meet the standard determined by the assessment criteria
- achieve the learning outcomes.

All the assignments created by centres should be reliable and fit for purpose, and should be built on the unit assessment criteria. Assessment tasks and activities should enable learners to produce valid, sufficient and reliable evidence that relates directly to the specified criteria. Centres should enable learners to produce evidence in a variety of forms, including performance observation, presentations and posters, along with projects, or time-constrained assessments.

Centres are encouraged to emphasise the practical application of the assessment criteria, providing a realistic scenario for learners to adopt, and making maximum use of practical activities. The creation of assignments that are fit for purpose is vital to achievement and their importance cannot be over-emphasised.

The assessment criteria must be clearly indicated in the assignments briefs. This gives learners focus and helps with internal verification and standardisation processes. It will also help to ensure that learner feedback is specific to the assessment criteria.

When designing assignments briefs, centres are encouraged to identify common topics and themes. A central feature of vocational assessment is that it allows for assessment to be:

- current, i.e. to reflect the most recent developments and issues
- local, i.e. to reflect the employment context of the delivering centre
- flexible to reflect learner needs, i.e. at a time and in a way that matches the learner's requirements so that they can demonstrate achievement.

Qualification grade

Learners who achieve the minimum eligible credit value specified by the rule of combination will achieve the qualification at pass grade.

In Pearson BTEC Level 4 Professional qualifications each unit has a credit value that specifies the number of credits that will be awarded to a learner who has achieved the learning outcomes of the unit. This has been based on:

- one credit for those learning outcomes achievable in 10 hours of learning time
- learning time being defined as the time taken by learners at the level of the unit, on average, to complete the learning outcomes of the unit to the standard determined by the assessment criteria
- the credit value of the unit remaining constant regardless of the method of assessment used or the qualification to which it contributes.

Quality assurance of centres

Pearson BTEC Level 4-7 qualifications provide a flexible structure for learners, enabling the study of programmes of varying credits and combining different levels. For the purposes of quality assurance, all individual qualifications and units are considered as a whole.

Centres delivering Pearson BTEC Level 4-7 qualifications must be committed to ensuring the quality of the units and qualifications they deliver, through effective standardisation of assessors and verification of assessor decisions. Centre quality assurance and assessment is monitored and guaranteed by Pearson.

Pearson quality assurance processes will involve:

- centre approval for those centres not already recognised as a centre for BTEC qualifications
- approval for Pearson BTEC Level 4-7 qualifications and units.

For all centres delivering Pearson BTEC qualifications at Levels 4-7, Pearson allocates a Standards Verifier (SV) for each sector offered, who will conduct an annual visit to quality assure the programmes.

Approval

Centres are required to declare their commitment to ensuring the quality of the programme of learning and providing appropriate assessment opportunities for learners that lead to valid and accurate assessment outcomes. In addition, centres will commit to undertaking defined training and online standardisation activities.

Centres already holding BTEC approval are able to gain qualification approval online. New centres must complete a centre approval application.

Quality assurance guidance

Details of quality assurance for Pearson BTEC Level 4-7 qualifications are available on our website (qualifications.pearson.com) under Signposts to Quality

Programme design and delivery

Mode of delivery

Pearson does not normally define the mode of delivery for Pearson BTEC Level 4 to Level 8 qualifications. Centres are free to offer the qualifications using any mode of delivery (such as full time, part time, evening only, distance learning) that meets their learners' needs. Whichever mode of delivery is used, centres must ensure that learners have appropriate access to the resources identified in the specification and to the subject specialists delivering the units. This is particularly important for learners studying for the qualification through open or distance learning.

Learners studying for the qualification on a part-time basis bring with them a wealth of experience that should be utilised to maximum effect by tutors and assessors. The use of assessment evidence drawn from learners' work environments should be encouraged. Those planning the programme should aim to enhance the vocational nature of the qualification by:

- liaising with employers to ensure a course relevant to learners' specific needs
- accessing and using non-confidential data and documents from learners' workplaces
- including sponsoring employers in the delivery of the programme and, where appropriate, in the assessment
- linking with company-based/workplace training programmes
- making full use of the variety of experience of work and life that learners bring to the programme.

Resources

Pearson BTEC Level 4 qualifications are designed to give learners an understanding of the skills needed for specific vocational sectors. Physical resources need to support the delivery of the programme and the assessment of the learning outcomes, and should therefore normally be of industry standard. Staff delivering programmes and conducting the assessments should be familiar with current practice and standards in the sector concerned. Centres will need to meet any specific resource requirements to gain approval from Pearson.

Delivery approach

It is important that centres develop an approach to teaching and learning that supports the vocational nature of Pearson BTEC Level 4 qualifications and the mode of delivery. Specifications give a balance of practical skill development and knowledge requirements, some of which can be theoretical in nature. Tutors and assessors need to ensure that appropriate links are made between theory and practical application and that the knowledge base is applied to the sector. This requires the development of relevant and up-to-date teaching materials that allow learners to apply their learning to actual events and activity within the sector. Maximum use should be made of learners' experience.

Access and recruitment

Pearson's policy regarding access to its qualifications is that:

- they should be available to everyone who is capable of reaching the required standards
- they should be free from any barriers that restrict access and progression
- there should be equal opportunities for all wishing to access the qualifications.

Centres are required to recruit learners to BTEC qualifications with integrity. This will include ensuring that applicants have appropriate information and advice about the qualifications and that the qualification will meet their needs. Centres should take appropriate steps to assess each applicant's potential and make a professional judgement about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner within the centre during their programme of study and any specific support that might be necessary to allow the learner to access the assessment for the qualification. Centres should consult Pearson's policy on learners with particular requirements.

Centres will need to review the entry profile of qualifications and/or experience held by applicants, considering whether this profile shows an ability to progress to a higher level qualification.

Restrictions on learner entry

The Pearson BTEC Level 4 Certificate in Optical Dispensing is accredited on the for learners aged 16 and above.

In particular sectors the restrictions on learner entry might also relate to any physical or legal barriers, for example people working in health, care or education are likely to be subject to Disclosure and Barring Service (DBS) checks.

Access arrangements and special considerations

Pearson's policy on access arrangements and special considerations for BTEC and Pearson NVQ qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the 2010 Equality Act) without compromising the assessment of skills, knowledge, understanding or competence.

Further information on access arrangements can be found in the Joint Council for Qualifications (JCQ) document *Access Arrangements, Reasonable Adjustments and Special Consideration for General and Vocational qualifications*.

Details on how to make adjustments for learners with protected characteristics are given in the document *Pearson Supplementary Guidance for Reasonable Adjustment and Special Consideration in Vocational Internally Assessed Units*.

Both documents are on our website at:

<http://qualifications.pearson.com/en/support/support-topics/understanding-our-qualifications/policies-for-centres-learners-and-employees.html>

Recognition of Prior Learning

Recognition of Prior Learning (RPL) is a method of assessment (leading to the award of credit) that considers whether a learner can demonstrate that they can meet the assessment requirements for a unit through knowledge, understanding or skills they already possess and so do not need to develop through a course of learning.

Pearson encourages centres to recognise learners' previous achievements and experiences whether at work, home and at leisure, as well as in the classroom. RPL provides a route for the recognition of the achievements resulting from continuous learning.

RPL enables recognition of achievement from a range of activities using any valid assessment methodology. Provided that the assessment requirements of a given unit or qualification have been met, the use of RPL is acceptable for accrediting a unit, units or a whole qualification. Evidence of learning must be sufficient, reliable and valid.

Unit format

All units in Pearson BTEC Level 4 Professional qualifications have a standard format. The unit format is designed to give guidance on the requirements of the qualification for learners, tutors, assessors and those responsible for monitoring national standards.

Each unit has the following sections.

Unit title

This is the formal title of the unit that will appear on the learner's certificate.

Unit code

Each unit is assigned a unit code that appears with the unit title on the Register of Regulated Qualifications.

Credit value

When a learner achieves a unit, they gain the specified number of credits.

Guided learning hours

Guided Learning Hours (GLH) is the number of hours that a centre delivering the qualification needs to provide. Guided learning means activities that directly or immediately involve tutors and assessors in teaching, supervising, and invigilating learners, for example lectures, tutorials, online instruction and supervised study.

Unit aim

The aim provides a clear summary of the purpose of the unit and is a succinct statement that summarises the learning outcomes of the unit.

Learning outcomes

The learning outcomes of a unit set out what a learner is expected to know, understand or be able to do as the result of a process of learning.

Assessment criteria

The assessment criteria of a unit specify the standard a learner is expected to meet to demonstrate that a learning outcome, or set of learning outcomes, has been achieved. The learning outcomes and assessment criteria clearly articulate the learning achievement for which the credit will be awarded at the level assigned to the unit.

Unit content

The unit content identifies the breadth of knowledge, skills and understanding needed to design and deliver a programme of learning to achieve each of the learning outcomes. This is informed by the underpinning knowledge and understanding requirements of the related National Occupational Standards (NOS), where relevant. The content provides the range of subject material for the programme of learning and specifies the skills, knowledge and understanding required for achievement of the unit.

Each learning outcome is stated in full and then the key phrases or concepts related to that learning outcome are listed in italics followed by the subsequent range of related topics.

Relationship between content and assessment criteria

The learner should have the opportunity to cover all the unit content.

It is not a requirement of the unit specification that all the content is assessed. However, the indicative content will need to be covered in a programme of learning in order for learners to be able to meet the standard determined in the assessment criteria.

Content structure and terminology

The information below shows how the unit content is structured and gives the terminology used to explain the different components within the content.

- Learning outcome: this is shown in bold at the beginning of each section of content.
- Italicised sub-heading: it contains a key phrase or concept. This is content which must be covered in the delivery of the unit. Colons mark the end of an italicised sub-heading.
- Elements of content: the elements are in plain text and amplify the sub-heading. The elements must be covered in the delivery of the unit. Semi-colons mark the end of an element.
- Brackets contain amplification of content which must be covered in the delivery of the unit.
- 'e.g.' is a list of examples, used for indicative amplification of an element (that is, the content specified in this amplification could be covered or could be replaced by other, similar material).

Units

Unit 1: Principles of Geometric Optics

Unit code: D/505/5901

Level: 4

Credit value: 4

Guided learning hours: 35

Unit aim

This unit aims to assess the learner's knowledge, understanding and skills in applying the basic principles of reflection, refraction and lens properties.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria
1 Be able to calculate optical lens properties	1.1 Specify lens properties for: <ul style="list-style-type: none"> • refractive index • Abbe number • relative curvature • density
	1.2 Calculate for lens properties: <ul style="list-style-type: none"> • Relative curvature • curve variation factor • surface powers • vergences • Critical angles
2 Be able to apply physical laws relevant to optics	2.1 Explain the laws of: <ul style="list-style-type: none"> • reflection • refraction
	2.2 Show the path of light rays through transparent objects
	2.3 Explain critical angles and total internal reflection

Unit content

1 Be able to calculate optical lens properties

Lens properties for:

- *refractive index*
- *Abbe number*
- *relative curvature*
- *density*

Refractive index: lens material with a higher Index of Refraction will bend more light and will require less of a curve to achieve a specific Rx. Surfacing with less curve for a given Rx will help keep the lens thinner. Higher index lenses typically have a higher specific gravity, due to the increased material density

Abbe number: the amount of chromatic aberration or tendency material to separate light, based on varying wavelength, of an ophthalmic lens material. The higher the Abbe value of a lens, the lower chromatic aberration, the lower the chromatic aberration, the better the clarity

Relative curvature: gives focus or changes focus of vision; curvature on lenses is measured by the diopter

Density: weight of lens materials; material density increases as lens thickness is reduced by increasing index; weight of lens depends on its shape and size, volume and the density of the lens material

Lens properties:

- *relative curvature*
- *curve variation factor*
- *surface powers*
- *vergences*
- *critical angles*

Relative curvature: less curvature a surface has the less it will bend the ray and therefore the less power it will have; more curvature a surface has, the more it will change the direction of a light ray and have greater power

Curve variation factor: gives focus or changes focus of vision

Surface powers: less curvature a surface has the less it will bend the ray and therefore the less power it will have; more curvature a surface has, the more it will change the direction of a light ray and have greater power

Vergences: light bundle in optics is the reciprocal of the distance between the point of focus and a reference plane; measured in dioptres ($1\text{ D} = 1\text{ m}^{-1}$); also a measure of the curvature of the optical wavefront

Critical angles: incidence of a ray crossing the interface between two media

2 Be able to apply physical laws relevant to optics

The laws of:

- *reflection*
- *refraction*

Reflection: when a ray of light strikes a mirror, the light ray reflects off the mirror; reflection involves a change in direction of the light ray; angle of incidence equals the angle of reflection

Refraction: when light travels from one medium to another, it generally bends, or refracts; a way of predicting the amount of bend; also known as Snell's Law

- *Path of light rays through transparent objects*

Objects that allow light to pass through them so that a clear image is visible; transparent objects, such as glass, let virtually all light rays pass straight through them

- *Critical angles and total internal reflection*

Critical angle: a unique angle of incidence that results in a refracted angle of 90° . This happens only when light passes into a more optically dense medium

Total internal reflection: when the angle of incidence is greater than the critical angle of a medium; light does not pass through and refract, it reflects off the boundary surface

Unit 2: Applied Optics of Spherical Lenses

Unit code: H/505/5902

Level: 4

Credit value: 5

Guided learning hours: 40

Unit aim

This unit aims to assess the learner's knowledge, understanding and skills in calculating optical properties of spherical lenses.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria
1 Be able to calculate the optical properties of spherical lenses	1.1 Analyse the relationship of properties of spherical lens surfaces
	1.2 Calculate properties of spherical lens surfaces
	1.3 Calculate the path of light rays at a curved lens surface
2 Be able to calculate the optical properties of thick lenses	2.1 Calculate the path of light rays through thick lenses
	2.2 Calculate the vertex powers of thick lenses and compensated powers
3 Understand the use of selected optical instruments to identify lens properties	3.1 Explain the use of selected optical instruments to identify lens properties
4 Be able to calculate lens properties from data obtained from selected optical instruments	4.1 Examine lenses to identify properties from data obtained by practical examination

Additional information

Relationship – is about how lens properties are related to each other.

Optical properties of thick lenses – is also a method known as 'Step Along'.

Unit content

1 Be able to calculate the optical properties of spherical lenses

- *The **relationship** of properties of spherical lens surfaces*

Concave, convex, flat (infinite radius): a lens has two surfaces through which light passes; surfaces may be mixed in type

- *Properties of spherical lens surfaces*

Aberrations; thickness; refracting surface; magnifying; thinner areas; power; converges/diverges; concave/convex; flat/bent

- *The path of light rays at a curved lens surface*

Bending light rays so the image can be focused sharply on the retina; the better the retina records the image, the brain will interpret the image, the image will be seen more clearly

2 Be able to calculate the optical properties of thick lenses

- *The path of light rays through thick lenses*

Spherical surface, shifting the ray of light/surface affects the way the light is reflected/refracted; focal point; axis; associated planes; foci; vertices; nodal points; principal

- *The vertex powers of thick lenses and compensated powers*

Front/back; principal planes; surface powers; index of refraction; thickness; radius; lens equation; front/back vertex powers; Gullstrand's equation; compensated power change

3 Understand the use of selected optical instruments to identify lens properties

- *The use of selected optical instruments to identify lens properties*

Interferometer; photometer; reflectometer; refractometer; spectrometer/monochromator; autocollimator; vertometer

4 Be able to calculate lens properties from data obtained from selected optical instruments

- *Lenses to identify properties from data obtained by practical examination*

Properties; tolerances; refractive index; density; Abbe number; reflectance; curve variation factor

Unit 3: Applied Optics of Prisms

Unit code: K/505/5903

Level: 4

Credit value: 4

Guided learning hours: 35

Unit aim

This unit aims to assess the learner's knowledge, understanding and skills in applying the optics of prisms.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria
1 Be able to calculate the optical properties of prisms	1.1 Evaluate the properties of optical and ophthalmic prisms 1.2 Analyse notation relating to prisms 1.3 Calculate the path of light rays through a prism 1.4 Explain the splitting of light by a prism
2 Be able to measure prism power	2.1 Calculate prism power
3 Be able to apply Prentice's rule to determine prismatic effect	3.1 Calculate prismatic effect using Prentice's rule
4 Be able to use decentration in optical dispensing	4.1 Calculate decentration required for a given prismatic effect

Unit content

1 Understand regulations and codes of practice relating to hearing aid industry

- *The properties of optical and ophthalmic prisms*

Change direction of light travel at designated angle; correction of imbalance/errors in eye orientation; incorporated into lens; decentrication; degree/direction of prism; correct tolerances

- *Notation relating to prisms*

Amount of prism required; base direction; 360 notation; indicated by the position on a compass

- *The path of light rays through a prism*

Incident ray; dispersion; refracted ray; angles; emergent ray; Snell's law

- *The splitting of light by a prism*

Speed of light; refraction of light; angles; dispersion; spectrum

2 Be able to measure prism power

- *Prism power*

Sphere/cylinder powers; minus – plus or vice versa; axis value; Prentice's rule; optical centre; distance; dioptric power; angle of deviation

3 Be able to apply Prentice's rule to determine prismatic effect

- *Prismatic effect using Prentice's rule*

Prentice's rule - the decentration of a lens in centimetres times the power of the lens is equal to the prismatic effect

4 Be able to use decentration in optical dispensing

- *Decentration required for a given prismatic effect*

Prentice's Rule; Power x decentration (in centimetres) = Prism

Unit 4: Dispensing Astigmatic Lenses

Unit code: M/505/5904

Level: 4

Credit value: 4

Guided learning hours: 30

Unit aim

This unit aims to assess the learner's knowledge, understanding and skills to perform calculations needed when dispensing for astigmatism.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria
1 Understand different types of astigmatism and principles of optical correction	1.1 Explain the different types of astigmatism
	1.2 Evaluate the principles of optical correction for astigmatism
2 Be able to use notation to describe astigmatic prescriptions and astigmatic lenses	2.1 Identify terminology used in dispensing for astigmatic prescriptions
	2.2 Describe standard notation used in dispensing for astigmatic prescriptions
	2.3 Apply standard notations to dispense astigmatic lenses
	2.4 Perform transposition of lens specifications

Unit content

1 Understand different types of astigmatism and principles of optical correction

- *The different types of astigmatism*

Simple hyperopic astigmatism: first focal line coincides with the retina while the second is located behind the retina; simple myopic astigmatism: first focal line is located in front of the retina while the second focal line is located on the retina; compound hyperopic astigmatism: both focal lines are located behind the retina; compound myopic astigmatism: both focal lines are located in front of the retina; mixed astigmatism: focal lines are on both sides of the retina/straddling the retina

- *The principles of optical correction for astigmatism*

Correction of refractive error of eyes by glasses or contact lenses; spherical lens power used for correction, 'cylinder' lens power to correct the difference between the powers of the two principal meridians of the eye

2 Be able to use notation to describe astigmatic prescriptions and astigmatic lenses

- *Terminology used in dispensing for astigmatic prescriptions*

Spherical content; diopters; identification of which eye/s; dioptres (the unit used to measure the correction); Sph refers to the 'spherical' portion of the prescription, which is the degree of short-sightedness or long-sightedness; Cyl refers to the 'cylinder' or degree of astigmatism present, can be a negative or a positive number; Axis is a number anywhere between 0 and 180

- *Standard notation used in dispensing for astigmatic prescriptions*

Identification of which eye/s; dioptres (the unit used to measure the correction); Sph refers to the 'spherical' portion of the prescription, which is the degree of short-sightedness or long-sightedness; Cyl refers to the 'cylinder' or degree of astigmatism present, can be a negative or a positive number; Axis is a number anywhere between 0 and 180 degrees- orientation of the astigmatism; 'prism' indicates the amount of correction that may be needed to align the eye/s

- *Standard notations to dispense astigmatic lenses*

Accuracy; competence; roles/responsibilities; checking; follow up

- *Transposition of lens specifications*

Accuracy; changing the powers of a sphero-cylinder lens or astigmatic prescription from one cylinder form to the other (- to + or + to -)

Unit 5: Lens Thickness and Dispensing

Unit code: T/505/5905

Level: 4

Credit value: 2

Guided learning hours: 17

Unit aim

This unit aims to assess the learner's knowledge, understanding and skills to calculate lens thickness and apply it in dispensing decision making.

Learners will use equations to find what is known as the surface sagitta (known as 'sag'). The sag for both surfaces enables learners to calculate lens thickness.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria
1 Understand the importance of lens thickness	1.1 Evaluate the influence of lens centre and edge thickness for frame choice and comfort during dispensing to patients
	1.2 Explain methods to reduce lens thickness during dispensing of spectacles
2 Be able to use the basic sagitta formula in optical calculations	2.1 Analyse the sagitta formula
	2.2 Perform calculations using the basic sagitta formula
	2.3 Apply sagitta formula to lens dispensing decisions

Unit content

1 Understand the importance of lens thickness

- *The influence of lens centre and edge thickness for frame choice and comfort during dispensing to patients*

Index; choice; preference; weight; comfort; durability; strength; range of sight; prescription; cost; choice; flexibility; safety; suitability

- *Methods to reduce lens thickness during dispensing of spectacles*

Materials; material density increases as lens thickness is reduced by increasing index; properties; lens form; the refractive index of the lens; the minimum substance of uncut lens; diameter and shape of the lens; anti-reflection coating

2 Be able to use the basic sagitta formula in optical calculations

- *The sagitta formula*

Used to find the depth of a lens; the radius of curvature of the surface

- *Calculations using the basic sagitta formula*

Used to find the thickness of lenses in the principal meridians;

$$s = r - \sqrt{r^2 - h^2} \cong h^2/2r$$

- *Sagitta formula to lens dispensing decisions*

Sagitta is the difference between centre and edge thickness; used to specify the distance on the normal from the surface of a concave

Unit 6: Spectacle Magnification and Field of View in Dispensing

Unit code: A/505/5906

Level: 3

Credit value: 2

Guided learning hours: 19

Unit aim

This unit aims to assess the learner's knowledge, understanding and skills in applying spectacle magnification and field of view.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria
1 Be able to calculate spectacle magnification	1.1 Explain the different types of spectacle magnification
	1.2 Calculate spectacle magnification with: <ul style="list-style-type: none"> • thin lenses • thick lenses
2 Understand how spectacles affect field of view	2.1 Analyse how field of view through spectacles is affected by: <ul style="list-style-type: none"> • lens power • fitting distance • frame aperture size
	2.2 Explain dispensing-related phenomena related to field of view, including scotoma

Unit content

1 Be able to calculate spectacle magnification

- *The different types of spectacle magnification*

The ratio of the retinal image of a distant object in the corrected ametropic eye to the blurred or sharp image formed in the same eye when uncorrected; thin lenses; thick lenses

- *Spectacle magnification with:*
- *thin lenses*
- *thick lenses*

Greater than unity in the hyperopic eye, and less than unity in myopia; spectacle magnification (SM) depends on the shape of the spectacle lens; the power of its front surface and its thickness and on the power of the lens

2 Understand how spectacles affect field of view

- *How field of view through spectacles is affected by:*
- *lens power*
- *fitting distance*
- *frame aperture size*

Lens power: as the magnitude of the surface power increases, the sagitta increases; steeper surfaces have greater surface heights than flatter surfaces; as the size of the lens increases, the sagitta increases; a change in diameter affects the sagitta more rapidly than a change in surface power

Fitting distance: suitability; measurements; prescription; power; lenses; field of view; frame

Frame aperture size: index; choice; preference; weight; comfort; durability; strength; range of sight; prescription

- *Dispensing-related phenomena related to field of view, including scotoma*

Observable event that results from the interaction of light and matter; transmission/absorption of light; refraction/reflection; scissors-motion movement; ghost images; veiling glare; with the motion movement

Scotoma: small, circular, optically insensitive region in the retina where fibres of the optic nerve emerge from the eyeball; has no rods or cones; also called optic disk

Unit 7: Multifocal and Progressive Lenses

Unit code: F/505/5907

Level: 3

Credit value: 4

Guided learning hours: 37

Unit aim

This unit aims to assess the learner's knowledge and understanding of dispensing spectacle lenses for presbyopia.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria
1 Understand presbyopia and its correction	1.1 Explain presbyopia
	1.2 Analyse the factors which influence the required reading addition
2 Understand the correction of presbyopia	2.1 Describe the different types of lens which are used for presbyopia
	2.2 Analyse the factors which influence the required reading addition
3 Understand different designs of progressive lens	3.1 Describe the different designs of progressive lens
	3.2 Evaluate the dispensing considerations for multifocal lenses

Unit content

1 Understand presbyopia and its correction

- *Presbyopia*

Refractive error; age related; results in the inability to focus up close, a problem associated with refraction in the eye

- *The factors which influence the required reading addition*

Other refractive errors, lifestyle; age; ability; usage; already prescribed; new prescription; non-prescription; cost

2 Understand the correction of presbyopia

- *The different types of lens which are used for presbyopia*

Convex; concave; bifocal; progressive; contact lens; reading glasses; trifocals; modified monovision

- *The factors which influence the required reading addition*

Lifestyle; age; ability; usage; already prescribed; new prescription; non-prescription; cost; other refractive errors

3 Understand different designs of progressive lens

- *The different designs of progressive lens*

Gradual; progressive; high index; lightweight; impact resistant; ease of use; polycarbonate

- *The dispensing considerations for multifocal lenses*

Comfort; enhancement; lifestyle; comfort; preference; appearance; safety; leisure activities; usage; support

Unit 8: Lens Design and Ametropia

Unit code: J/505/5908

Level: 4

Credit value: 3

Guided learning hours: 30

Unit aim

This unit aims to assess the learner's knowledge and understanding of refractive errors and factors that influence lens design for refractive correction.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria
1 Understand the factors considered for lens design	1.1 Explain the key factors considered in lens design
2 Understand the types of aberration which affect optical performance of lenses	2.1 Analyse the different types of aberration
	2.2 Explain how to overcome different types of aberration through lens design
3 Understand the optics of the eye relating to ametropia	3.1 Explain optical properties of the eye
	3.2 Explain refractive errors of the eye
	3.3 Explain how to correct refractive errors

Unit content

1 Understand the factors considered for lens design

- *The key factors considered in lens design*

Materials; focal/refractive power; lens form/profile; bent lens; flat lens; base curve; focal power formula; refraction; weight; CR-39 Plastic; crown glass; mid-index plastic; polycarbonate; index plastic; index glass; high index plastic; ultra-high index plastic

2 Understand the types of aberration which affect optical performance of lenses

- *The different types of aberration*

Lens shape; chromatic aberrations when using more than one wavelength of light; monochromatic aberrations present with a single wavelength of light

- *How to overcome different types of aberration through lens design*

Corrective lenses; Abbe theory; distance of intersection; dispersive power of lens; high index materials; prism; aspheric lens; focal length

3 Understand the optics of the eye relating to ametropia:

- *Optical properties of the eye*

External: eyelids, eyelashes, cornea, epithelium, iris, lens, pupil, lacrimal glands, extraocular muscles, aqueous humour

Internal: retina, macula, fovea, optic nerve, vitreous gel, sclera, fovea, blind spot

- *Refractive errors of the eye*

Eye cannot focus clearly; reduced visual acuity. myopia (nearsightedness); hyperopia (farsightedness); astigmatism: distorted vision resulting from an irregularly curved cornea

Presbyopia: which leads to difficulty in reading or seeing at arm's length

- *How to correct refractive errors*

Lenses correct refractive errors by refracting light as it passes through the lens; greater clarity; less stress on eyes; range of materials available; type/form of lens; enhanced vision; minimising lens thickness/weight

Unit 9: Principles of Light Applied to Optics

Unit code: F/505/5910

Level: 2

Credit value: 2

Guided learning hours: 19

Unit aim

This unit aims to assess the learner's knowledge and understanding of the basic principles of light waves.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria
1 Understand basic principles of light which are relevant to optical theory	1.1 Explain key concepts relating to the: <ul style="list-style-type: none">• propagation• properties• movement of light waves
	1.2 Explain how mathematical concepts can be used to calculate properties of a wave
	1.3 Explain the types of interaction of light waves
	1.4 Analyse the interaction of light waves with objects in their path
2 Understand the electromagnetic spectrum	2.1 Explain different types of electromagnetic radiation
	2.2 Explain the properties of electromagnetic radiation
	2.3 Describe the components of the visible spectrum

Additional information

Interaction of light is light waves interacting with each other – interference, destructive and constructive.

Unit content

1 Understand basic principles of light which are relevant to optical theory

- *Key concepts relating to the:*
- *propagation*
- *properties*
- *movement of light waves*

Propagation: speed; index of refraction; affected by phenomena refraction; reflection; diffraction; interference; vergence

Properties: travel; can be bent (refraction); reflected; energy; speed

Movement of light waves: bending; angle of refraction; reflection; scattering

- *How mathematical concepts can be used to calculate properties of a wave*

Energy; wavelength; frequency; measured in units; centimetre; Angstrom; nanometre; micrometre

- *The types of interaction of light waves*

Reflection; refraction; defraction; interference; absorption; scattering

- *The **interaction of light** waves with objects in their path*

Wavelength; frequency; interference; spectrum; spatial configuration; liquids; solids; length scale; altered; scattering

2 Understand the electromagnetic spectrum

- *Different types of electromagnetic radiation*

X-rays; visible light; radio waves; gamma radiation; infrared

- *The properties of electromagnetic radiation*

Reflection; refraction; diffraction; interference

- *The components of the visible spectrum*

The section of the electromagnetic radiation spectrum that is visible to the eye; red; orange; yellow; green; blue; violet

Further information

For further information please visit our website at:

<http://qualifications.pearson.com/en/support/contact-us.html>

To get in touch with us visit our 'Contact us' pages:

- Edexcel, BTEC and Pearson Work Based Learning contact details: qualifications.pearson.com/en/support/contact-us.html
- books, software and online resources for UK schools and colleges: www.pearsonschoolsandcolleges.co.uk

Key publications

- *Adjustments for candidates with disabilities and learning difficulties, Access and Arrangements and Reasonable Adjustments, General and Vocational qualifications* (Joint Council for Qualifications (JCQ))
- *Supplementary guidance for reasonable adjustments and special consideration in vocational internally assessed units* (Pearson)
- *General and Vocational qualifications, Suspected Malpractice in Examination and Assessments: Policies and Procedures* (JCQ)
- *Equality Policy* (Pearson)
- *Recognition of Prior Learning Policy and Process* (Pearson)
- *UK Information Manual* (Pearson)
- *Pearson Edexcel NVQs, SVQs and competence-based qualifications – Delivery Requirements and Quality Assurance Guidance* (Pearson)

How to obtain National Occupational Standards

Please contact:

Skills for Health
Lynton House
Tavistock Square
London WC1H 9LT

Telephone: 0207 388 8800

Email: Office@skillsforhealth.org.uk

www.skillsforhealth.org.uk

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Pearson supports UK and international customers with training related to BTEC qualifications. This support is available through a choice of training options offered in our published training directory or through customised training at your centre.

The support we offer focuses on a range of issues, including:

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- developing effective assignments
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- developing student-centred learning and teaching approaches
- building Functional Skills into your programme
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Annexe A

Spiritual, moral, ethical, social and cultural issues

Throughout the delivery of these qualifications learners will have the opportunity to actively participate in different kinds of decision making. They will have to consider fair and unfair situations and explore how to resolve conflict. Working in small groups they will learn how to respect and value others' beliefs, backgrounds and traditions.

Citizenship

Learners undertaking these qualifications will have the opportunity to develop their understanding of citizenship issues.

Environmental issues

Developing a responsible attitude towards the care of the environment is an integral part of this qualification. Learners are encouraged to minimise waste and discuss controversial issues.

European developments

Much of the content of the qualification applies throughout Europe, even though the delivery is in a UK context.

Health and safety considerations

Health and safety is embedded within many of the units in this qualification. Learners will consider their own health and safety at work, how to identify risks and hazards and how to minimise those risks.

Equal opportunities issues

There will be opportunities throughout this qualification to explore different kinds of rights and how these affect both individuals and communities, for example learners will consider their rights at work and the rights of employers and how these rights affect the work community.

Annexe B

Skills for Health Assessment Principles

Skills for Health Assessment Principles for Qualifications that Assess Occupational Competence

Version 2.6

October 2012

- 1 Introduction
 - 1.1 Skills for Health is the Sector Skills Council (SSC) for the UK health sector.
 - 1.2 This document sets out those principles and approaches to Qualifications and Credit Framework (QCF) unit/qualification assessment not already described in the Regulatory Arrangements for the QCF. The information is intended to support the quality assurance processes of Awarding Organisations that offer qualifications in the sector, and should be read alongside these. It should also be read alongside individual unit assessment requirements.
 - 1.3 These principles will ensure a consistent approach to those elements of assessment which require further interpretation and definition, and support sector confidence in the new arrangements.
 - 1.4 These principles apply to qualifications and the units therein that assess occupational competence, i.e. those under Purpose D.
- 2 Assessment Principles
 - 2.1 Learners must be registered with the Awarding Organisation before formal assessment commences.
 - 2.2 Assessment decisions for competence-based units must be made by an occupationally competent assessor primarily using evidence generated in the workplace during the learners normal work activity. Any knowledge evidence integral to these learning outcomes may be generated outside of the work environment.
 - 2.3 Assessment decisions for competence units must be made by an assessor who meets the requirements set out in the qualification's assessment strategy. Where the Awarding Organisation requires that the assessor holds, or is working toward, a formal QCF qualification, that qualification should be the Level 3 Certificate in Assessing Vocational Achievement. Assessors holding the D32/33 or A1 qualifications are not required to re-qualify. Where an Awarding Organisation does not expect the assessor to hold or be working toward a formal qualification we would expect that Awarding Organisation to ensure that the assessor meets the same standards of assessment practice as set out in the Learning and Development National Occupational Standard 09 Assess learner achievement.
 - 2.4 Competence-based units must include direct observation in the workplace as the primary source of evidence.

- 2.5 Simulation may only be utilised as an assessment method for learning outcomes that start with 'be able to' where this is specified in the assessment requirements of the unit. The use of simulation should be restricted to obtaining evidence where the evidence cannot be generated through normal work activity. Where this may be the case the use of simulation in the unit assessment strategy will be agreed with Skills for Health.
- 2.6 Expert witnesses can be used for direct observation where they have occupational expertise for specialist areas or the observation is of a particularly sensitive nature. The use of expert witnesses should be determined and agreed by the assessor.
- 2.7 Assessment decisions for knowledge only units must be made by an assessor qualified to make the assessment decisions as defined in the unit assessment strategy.
- 3 Internal Quality Assurance
- 3.1 Internal quality assurance is key to ensuring that the assessment of evidence for units is of a consistent and appropriate quality. Those carrying out internal quality assurance must be occupationally knowledgeable in the area they are assuring and be qualified to make quality assurance decisions.
- 3.2 Skills for Health would expect that where the Awarding Organisation requires those responsible for internal quality assurance to hold formal QCF qualifications that these would be the Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practice or the Level 4 Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practice, as appropriate depending on the role of the individual. Those responsible for internal quality assurance holding the D34 or V1 qualifications are not required to re-qualify. Where an Awarding Organisation does not expect those responsible for internal quality assurance to hold or be working toward a formal QCF qualification we would expect that Awarding Organisation to ensure that those responsible for internal quality assurance meet the standard of practice set out in the Learning and Development National Occupational Standard 11 Internally monitor and maintain the quality of assessment.
- 4 Definitions
- 4.1 Occupationally competent
- This means that each assessor must be capable of carrying out the full requirements within the competence unit/s they are assessing. Occupational competence must be at unit level which might mean different assessors across a whole qualification. Being occupationally competent means they are also occupationally knowledgeable. This occupational competence should be maintained through clearly demonstrable continuing learning and professional development. This can be demonstrated through current statutory professional registration.
- 4.2 Occupationally knowledgeable
- This means that each assessor should possess relevant knowledge and understanding, and be able to assess this in units designed to test specific knowledge and understanding, or in units where knowledge and understanding are components of competency. This occupational knowledge should be maintained through clearly demonstrable continuing learning and professional development.

4.3 Qualified to make assessment decisions

This means that each assessor must hold a relevant qualification or be assessing to the standard specified in the unit/qualification assessment strategy.

4.4 Qualified to make quality assurance decisions

Awarding Organisations will determine what will qualify those undertaking internal quality assurance to make decisions about that quality assurance.

4.5 Expert witness

An expert witness must:

- have a working knowledge of the QCF units on which their expertise is based
- be occupationally competent in their area of expertise
- have EITHER a qualification in assessment of workplace performance OR a professional work role which involves evaluating the everyday practice of staff.

Annexe C

Unit mapping overview

Pearson BTEC Level 4 Certificate in Optical Dispensing is a new version of the Pearson EDI Level 4 Professional qualification in Optical Dispensing

Old units \ New units	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
Unit 1	F								
Unit 2		F							
Unit 3			F						
Unit 4				F					
Unit 5					F				
Unit 6						F			
Unit 7							F		
Unit 8								F	
Unit 9									F

KEY

P – Partial mapping (some topics from the old unit appear in the new unit)

F – Full mapping (topics in old unit match new unit exactly or almost exactly)

X – Full mapping + new (all the topics from the old unit appear in the new unit, but new unit also contains new topic(s))

May 2017

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