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**TSST COURSE AUDIT FORM**

**This form is designed to allow community based panels of teachers to evaluate each other's course, facilitated by the Institute of Physics.**

**Courses which meet the required standard will be deemed to have received IOP-enabled community approval.**

**Evaluators will be primarily looking at consistency between course objectives/outcomes and mode of delivery. The audit form is designed to test the coherence of the course as described. Individual courses may vary in length and it is for individual participants to decide which advertised length suits their needs best.**

**However, based on community feedback, it was felt that it would be helpful to provide some guidance as to specific aspects. Most specific recommendations are given in the Notes columns. In addition it was felt that a TSST course securing IOP approval would normally be expected to take 30-50 hours to complete, excluding unmonitored independent learning time. Please note that a course submitted for auditing will not be penalised if it does not meet a stated guideline. However, the approval panel will expect to see some justification.**

**Institute of Physics will publish details of all community approved courses on the IOP website.**

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| **Name of lead school** | Outwood Grange Academies Trust |
| **Lead contact** | Ian Cooper |
| **Date submitted** | 15.11.18 |

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| **Course summary** | **Notes** |
| The course is an opportunity for teachers at various stages in their career who strive to increase their knowledge, experience and pedagogical skill around the subject of physics. The course will be taught over 10 sessions and will explore the fundamental key concepts with a general focus on the new GCSE. For each of these topics candidates will explore and practice the key practical’s and develop experience on alternative hands-on opportunities that help explore and develop students understanding of the topic further. The aim of the course is to support teachers who will teach physics at KS3 and KS4. Through a variety of activities, guided independent study and discussion groups, teachers will gain confidence and familiarity with all topics in order to provide a good level of subject delivery with further opportunities to stretch students and explore the phenomenal subject of physics. The course has been designed by experienced physics teachers at KS4 and KS5. Ian Cooper (BEng Hons, PGCSE) with 13 year experiences teaching from KS3 to KS5 and Dan Woffindin (BSc Hons, PGCE) 14 years’ experience teaching from KS3 to KS5. Other teachers from across the trust will support hosting the sessions to ensure candidates are exposed to best practice. | Short description of the course (e.g. objectives and expected outcomes) |

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|   | **Subject area (indicate number of hours)** |
| **Mode of delivery** | Energy | Motion & Forces | Waves | Electricity  | Space | Thermal Physics | Electromagnetism | Radioactivity | Pressure and moment | **Other** |
| Face to Face (Presentations, lectures, guided group tutorial work with tutor present) | 1.5 | 1 |  2 |  1 | 1 |  1 | 1 | 1 | 1 |    |
| Practical (Hands on use of apparatus working individually or small groups. Observation of demonstrations is not deemed to be practical work) | 2 | 2 |  2 | 2.5 | 1 | 2 | 2 | 1.5 | 1.5 |    |
| Coaching/ Mentoring (One to one or small group sessions involving coaching, mentoring or allied techniques led by an experienced practitioner.) | 0.5 | 0.5  | 1  | 1  | 2 |  0.5 | 0.5 | 1 | 0.5 |    |
| Monitored independent learning (e.g. online tutorial work) | 1  | 1  |  1 | 1  | 1 | 1  | 1 | 1 | 1 |    |
| Other modes (please specify below)Targeted reading or set tasks within classroom. | 1  |  2 |  1 |  1 | 1 | 0.5 | 1 | 1 | 1 |    |
| **Total hours** | 6 | 6.5 | 7 | 6.5 | 6 | 5 | 5.5 | 5.5 | 5 |  |

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| **Please provide further *brief* detail on the following aspects of the course** | **Notes** |
| **Practical Work** | Specify what nature is – e.g. embedded in related session/standalone/skills focussed, work in pairs/groups. Also include Health and Safety measures in place.  |
| Participants will be paired (both non specialist’s). All participants will have access to the required practicals for the new GCSE. Participants will gain exposure to alternative practical’s as well key points as to where the practical may give errors or equipment is unavailable. Practical skills will be developed through explanations and demonstrations within the lab/classroom setting. The participants will be required to perform most practicals and record results using a lab book. In the case of a wide variety of practical’s (energy and electricity) participants may present demonstrations to the group. The required practicals however, will need to be documented. Health and safety will be a key focus for all practical or modelling work. The participants will be questioned throughout the practical demonstrations in order to develop their own confidence in order to be able to support students in the laboratory. By presenting to the group participants will gain experience on common misconceptions, questions and potential errors that can occur.Set out below is the list of practical activities that each participant will engage in. Whilst these are essential for delivering the new GCSE other practical activities will be introduced to support teaching and learning.Practicals covered:Specific heat capacity (Session 6) Densities of regular and irregular solid objects and liquids (Session 2)Thermal insulation of properties (session 6) Force and extension of a spring (session 1)Resistance of a wire (Session 4) Acceleration of constant mass/varying force (session 2)Combinations of resistors in series and parallel (session 4) Ripple tank (session 7)I-V characteristics of a lamp, diode and a resistor (session 4) Reflection and refraction (session 7)Infrared radiation absorption and radiation (Session 7) |
| **Subject knowledge** | Please give more details on methodology of subject knowledge (e.g. lecture, practice questions, peer tutorial, diagnostic testing) |
| Subject knowledge will be shared using a variety of presentations, reading and modelling. The course material will be delivered by experienced Physics teachers of 10+ years. The course will be overseen and hosted by the Senior Director of Science. In the delivery the course teachers will cover knowledge early on from KS2 (introduction) but primarily focus on KS3 and KS4. Where appropriate course teachers will discuss next steps and link subjects to KS5 as a means of increasing interest at this level. Through mentoring, small and large group discussions participants will gain confidence in their knowledge as subjects are put into everyday concepts or misconceptions are exposed. Whilst delivered in a relaxed approach knowledge and recall of equations will be tested throughout the course and participants will be able to see progress after each session. Exam questions will be used to assess knowledge as well as diagnostic testing throughout as a means to assess understanding knowledge or of misconceptions. |
| **Pedagogical Content Knowledge** | Give further details on methodology used (e.g. pupils, misconceptions/naïve conceptions) |
| Diagnostic tests will help direct the focus of the session. Misconception/naïve conceptions will be discussed throughout the course using presenter’s experience, student exam papers and participant’s experience. The misconceptions will be discussed in an open forum in order to share and tackle the origin of the misunderstanding. Common misconceptions include the ‘loss’ of energy, battery ‘providing’ electrons! ‘exposure’ to radiation and the effects of forces to name a few. Participants will be required to share these misconceptions at the beginning of each session. Also and where applicable, examiners reports will be used to highlight the common errors or trends in student’s answers.  |
| **Research Informed Practice** | How do you propose to embed the results of research informed best practice (e.g. access to research articles)  |
| Participants will be given the opportunity to observe best practice in order to present and discuss the key points of good teaching. Participant will be required to assess current schemes of work and rewrite or plan material to be used within their departments. Various teaching styles and approaches will be used throughout the course based upon the Kagan Cooperative structures. The pedagogical content of the course will draw upon the work of Guy Claxton, Dylan William, Jim Ryder and Phil Scott as well as some of the teaching demonstration from Julian Sprott, David Sang and Robert Ehrlich. These as well as other influences such as popular media and the cohort reading book of ‘storm in a team cup’ by Helen Czerski will support discussions during the course.  |
| **Handling of Mathematical Requirements** | e.g. handling of graphical techniques, proportionality, errors |
| During the introductory session participant will experiences all the mathematical requirements in one practical. Throughout other sessions these points will be reinforced as each required practical will have with it an expectation that the participants can present results to the correct significant figures, errors, estimations, identify mode median and mean, apply conversions between units and correctly rearrange equations. There will be a significant focus on the new mathematical requirements for the new specification to support participants and to increase their confidence when delivering to students. Time has been allocated to support participants with the mathematical requirements on an individual or small group level.Graph skills will be addressed in the first session but specifically when looking at Hooke’s Law, Electricity and current, forces and radioactivity. Participants will be expected to evidence these graphs in their own lab books. Exemplar work will be shared with participants. |
| **Participant Assessment Arrangements** | Use of various modes e.g. lesson observation, portfolio, diagnostic testing, etc.  |
| Participants will be assessed using diagnostic testing throughout the course. Key assignments will be handed out at the end of each session, for example exam questions, exemplar work or the planning of a lesson. Peer and self-assessment will be used for exam style questions. Feedback will be given and any resources will be shared with the group. |
| **Quality Assurance Mechanisms** | Mention use of any form of quality assurance – use of validated material, external validation or accreditation. Please include qualifications of staff.  |
| Where applicable IOP resources to be merged with course material. Course presenters are experienced physics teaching staff with experience of delivering school CPD and examining national qualifications. Each session will be staffed by two physics specialist with the opportunity for other physics specialists to ‘host’ certain sessions or demonstrations. QA evaluations will be used for each session and filed for evidence. Feedback after each session will be reviewed by the presenters in order to address key points for development or review any requirements for further work. The Executive Director of the institute of education will oversee the delivery of the course to ensure alignment with other TSST courses delivered by the centre. |
| **Individualisation for Participants** | Mention any separate routes possible, and how those routes are decided. |
| A knowledge and skill audit will be carried out for each session. The final session provided sufficient time to cover areas that require further focus or are requested by staff in order to increase depth of knowledge. Participant are encouraged to discuss and share work through accessible on line forum. Recommendations of further reading and resources to be shared via this forum. Two course presenters for every session allows good contact ratio. |
| **Course Evaluation Mechanism** | Mention evaluation by participants, or external body, if you intend to publish survey results etc.  |
| Expectations and skill audit will be given in the first session. Each session will then be evaluated using the institute of education evaluation form. The final session will be an celebration and evaluation off the course and participant will be given the opportunity to evaluate their experience against their expectations of the course |
| **Lifelong Learning of Participants** | The TSST courses are inevitably of limited duration. Explain how participants are enabled to acquire the skills for autonomous learning beyond the course itself.  |
| It is the intention that some successful participants then present on the course in the following years. Where applicable material opening up access to KS5 and HE will be used and shared with participants. Material from the IOP, media and publications will be accessible. By giving each candidate the book ‘storm in a tea cup the physics of everyday life’ by Helen Czerski they will be encouraged to discuss key points in the book with the intention of recommending further books that explore physics in general. |

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